Middle Level SSAT® 1500+ Practice Questions

Answer Keys & Explanations

Table of Contents

Diagnostic Practice Test (Form A)
Section 1 – Quantitative

1. E. *Numbers – Order of Operations*. Within the parentheses, evaluate the multiplication operation, then subtraction: $(3 \times 4 – 3)^2 = (12 – 3)^2 = (9)^2$. Then, evaluate the exponent. $(9)^2 = 81$. Lastly, evaluate the addition operation: $81 + 4 = 85$.

2. D. *Pre–Algebra – Sequences, Patterns & Logic.* The difference between the first and second terms is 5. The difference between the second and third terms is 8. The difference between the third and fourth terms is 11. The difference between the fourth and fifth terms is 14. Each subsequent term, the difference from the previous term increases by 3. Thus, the difference between the fifth and sixth terms must be $14 + 3 = 17$ and the term must be $41 + 17 = 58$.

3. C. *Measurement – Mean, Median & Mode.* Solve by ordering the numbers: –22, –11, –2, 1, 2, 12, 21. The median is the value in the middle, or 1 in this case.

4. C. *Geometry – Circles.* If the radius of the circle is 1.4cm, then the diameter is 2.8cm. Plugging 2.8 for d and 3.14 for π into the equation $C = \pi$d yields $C = 2.8 \times 3.14$. Rather than computing the product 2.8×3.14, we can estimate using $3 \times 3 = 9$. The only answer choice close to 9 is 8.792.

5. B. *Numbers – Fractions.* After Richard eats $\frac{1}{2}$ of his cake, he has $\frac{1}{2}$ of the cake left. He then eats $\frac{1}{6}$ of that, or $\frac{1}{2} \times \frac{1}{6} = \frac{1}{12}$. In total, he eats $\frac{1}{2} + \frac{1}{12} = \frac{6}{12} + \frac{1}{12} = \frac{7}{12}$. Since we want to know how much cake is left, subtract $\frac{7}{12}$ from the entire cake to get $1 – \frac{7}{12} = \frac{12}{12} – \frac{7}{12} = \frac{12-7}{12} = \frac{5}{12}$.

6. D. *Pre–Algebra – Spatial Reasoning.* The two smaller triangles in the middle make a square. The middle and top triangle together make a parallelogram, as do the middle and rightmost triangle. The three triangles on the bottom form a trapezoid, as do the three on the left do as well, and the diagonally connected three on the right. Altogether, there are 6 possibilities.

7. C. *Numbers – Percents.* To find percent change, plug the new and original values into the equation $\frac{new-original}{original}$: $\frac{9-7.5}{7.5} = \frac{1.5}{7.5} = \frac{1}{5}$. $0.2 = 20\%$ increase.

8. D. *Measurement – Angles.* The two angles are complementary, meaning they have a sum of 90°. Since we know the measure of one angle, $36 + b = 90$. Solving for b yields $b = 54$.

9. C. *Pre–Algebra – Estimation.* Round $734.06 to $740 and 19 to 20. To find the approximate cost per person, divide: $740 \div 20 = 37.

10. D. *Pre–Algebra – Sequences, Patterns & Logic.* The series will proceed 4, 8, 16, 32, 64, 128, 256, 512, and so on. Of the answer options, only 256 is included in the series.

11. A. *Numbers – Basic Computation*. First multiply 53×47 to get 2,491. Then subtract 2,000 from 2,491 to obtain 491.

12. E. *Numbers – Whole Numbers*. Since all multiples of 6 are also multiples of 2, you can just list all multiples of 6 that are less than 50, which are 6, 12, 18, 24, 30, 36, 42, and 48.

13. D. *Numbers – Fractions*. Use the expression $\frac{3}{5} \div 4$ to find the fraction of the pie each person receives. $\frac{3}{5} \div 4 = \frac{3}{5} \times \frac{1}{4} = \frac{3}{20}$.

14. C. *Numbers – Basic Computation*. First multiply $34 \times 46 = 1,564$. Then subtract 36 from 1,564 to obtain 1,528.

15. E. *Numbers – Decimals.* If you round to the thousandths place, the number you obtain must have no more than three digits after the decimal point. Since 6 is greater than or equal to 5, you round 0.4256 up to 0.426 and not down to 0.425.

16. B. *Geometry – 2 & 3 Dimensional Shapes*. A figure can be drawn without lifting the pencil or retracting if either all vertices have an even number of paths leading to them or there are only two vertices with odd paths leading to them. Choice B has four vertices with three paths.

17. B. *Pre–Algebra – Ratios & Proportions*. Since 3 tigers weigh as much as 4 lions, then 6 tigers weigh as much as 8 lions. If 6 tigers, 8 lions, and 10 leopards all weigh the same, the answer is 10.

18. C. *Algebra – Solving Equations and Inequalities.* Following the order of operations, multiply first, then subtract: $2 \times j = 2j$, and $5 – 2j = 12$. Add 2j to both sides: $5 = 12 + 2j$. Subtract 12 from both sides: $–7 = 2j$. Divide both sides by 2: $j = –\frac{7}{2}$.

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19. D. *Measurement – Area, Perimeter & Volume*. If *KL* = *KM* and *KL* = 7, then *KM* = 7. Since the third side (LM) = 4, the perimeter of the triangle is the sum of the three sides: 7 + 7 + 4 = 18.

20. C. *Algebra – Interpreting Variables*. To simplify this expression, distribute the 2 over 4*n* and 3: 2 × 4*n* = 8*n* and 2 × 3 = 6. Therefore, this expression is equal to 8*n* + 6.

21. C. *Algebra – Multi-Step Word Problems.* (2 rows of carrots × 12 carrots/row) = 24 carrots. (3 rows of tomato plans × 16 tomato plants/row) = 48 tomato plants. (4 rows of flowers × 10 flowers/row) = 40 flowers. 24 carrots + 48 tomato plants + 40 flowers = 112 items in the garden.

22. D. *Measurement – Time & Money.* Starting with the largest denomination, Teddy takes one 25-cent coin, and still needs 17 cents. He takes one of the next largest coins (10-cent coin), and still needs 7 cents. He takes one of the next largest coin (5-cent coin), and still needs 2 cents. For this, he takes two 1-cent coins. Therefore, the least number of coins Teddy must take is 5 coins.

23. C. *Algebra – Solving Equations and Inequalities.* Divide both sides by –1 to obtain *x* – 3 = –3. Isolate *x* by adding 3 to both sides. *x* = –3 + 3 = 0.

24. E. *Geometry – Coordinate Planes.* If Gina walks two blocks west, she is walking two units to the left. Three blocks south is moving three units down. Following this path, she will arrive at point E.

25. D. *Geometry – Transformations.* The *x*-coordinate –4 is located to the left of the original *x*-coordinate 1. The *y*–coordinate –9 is located below the original *y*-coordinate –7.

Section 2 – Reading

1. A. *Tone/Mood/Style.* The sentence in question compares Ted's imagination to lightning. Because the word "like" is used to make this comparison, we know that the literary device being used is a simile. A metaphor makes a direct comparison. Personification gives human qualities to non-human things. Onomatopoeia is a word that is written like it sounds. Allegory is a story with a hidden message or theme.

2. D. *Detail.* In the passage, Ted wonders if "Mr. Wharton would let him run some wires from the barn to the shack." This means that Mr. Wharton's barn must be at least somewhat close to Ted's property. While Ted eventually determines that Mr. Wharton will not want to share electricity, this is not enough evidence to suggest that Mr. Wharton "never likes to share" – this answer is too extreme. The passage does not mention that Mr. Wharton is Ted's father, is very generous (the opposite seeming to be true), nor cares about Ted's well-being.

3. B. *Detail.* From the context of the last paragraph, we can deduce that the qualities of the shack being described are negative. As such, our answer will have a similarly negative charge. "Gloomy" has a negative charge and best describes the deteriorating state of the shack. While "annoying" also has a negative charge, it does not perfectly describe the manner in which the shack is falling apart.

4. E. *Main Idea.* This passage tracks the joy of a man who is eager to live in his new home. This can be summarized as an "exciting new development," so E is the best answer. "The life of a former farmer" is too broad and "the various uses of electricity" are mentioned briefly, not for most of the passage. The passage does not describe anything "dangerous" nor does it focus on a "conflict."

5. E. *Inference.* Throughout the passage, Ted expresses his excitement about his new home, claiming "how nice it would be to finally have a place which he could call his own!" He goes on to suggest that "no matter how tiny his room was, it made him happy to know he would be the king of his own realm." We can therefore deduce that despite the shack's appearance, Ted is pleased simply to have his own home—he prefers freedom more than material things.

6. C. *Inference.* Using the detail "for public view," we can infer that the placement must be somewhere that everyone can see, even those who are not working in kitchens, eating in the dining room, or sitting at a table.

7. D. *Main Idea.* The third paragraph begins by claiming that "the biggest issue with the current grading system is a lack of transparency." It goes on to discuss why this lack of transparency is problematic for patrons and restaurants. Answers A, B, C, and E do not have textual support in this paragraph. Though they are mentioned more generally in the paragraph, these are not conclusions that can be drawn.

8. A. *Detail.* The passage indicates that grading is determined by "a single inspector." "One person" is thus the best answer. The passage does not mention that online surveys, the city mayor, a team of health experts, or patron reviews determine restaurant grades.

9. C. *Inference.* The author suggests that a lack of transparency is the biggest problem facing the current grading system, adding that patrons do not know how grades are determined and may be led to misguided assumptions about a restaurant's hygiene. There is no suggestion that the DOH be disbanded,

that food hygiene standards are pointless, that "D" and "E" should be incorporated into grading, nor that health inspection grades should be private.

10. A. *Inference.* The author spends the entirety of the passage criticizing how the DOH handles restaurant hygiene. The author is not admiring, impartial, or encouraging. "Disappointed" suggests that the author was at one point optimistic about the DOH, which is not the case.

11. B. *Main Idea.* All other choices convey details from the passage about John Muir and his life, but only this choice conveys the idea that Muir wanted to accomplish something that, according to the author, still needs to be done today.

12. B. *Detail.* Although Theodore Roosevelt is the one who signed the Antiquities Act, the first paragraph states that it was Muir whose writings earned him the title "the father of the national parks."

13. E. *Inference.* All of Muir's life and work demonstrate his belief that all parts of nature are connected, but the author includes the quote here specifically to support the idea in the previous sentence that people have a responsibility to care for all parts of the natural world.

14. D. *Inference.* The author goes on to insist that all ecosystems are connected, so the implication is that people probably do not consider how the health of faraway ecosystems affects them.

15. B. *Tone/Mood/Style.* The author's tone in the last paragraph might possibly be described as "excited," but "concerned" better conveys the author's aim of convincing the reader that many places around the world still need understanding and protection.

16. B. *Main Idea.* In the opening paragraph, the author states that the recipients were chosen for the impact they had "...not in short, blinding bursts, but steadily, over the course of a lifetime" (lines 3-4), implying that consistency was important. Both artists demonstrated a consistent, lifelong devotion to their art: Bob Dylan, "All these years later, he's still chasing that sound" (lines 11-12), and Toni Morrison writing despite unideal circumstances (line 16). While they may have been ambitious in their careers, the speaker focuses more on their passion for the work. There is no mention of Bob Dylan being a good parent, or of either artist focusing on freedom.

17. D. *Inference.* Using the context clues in "This is the highest civilian honor this country can bestow" (line 1), and the conclusion paragraph of "These are the recipients of the 2012 Medals of Freedom" (line 21), it can be assumed that the speech is about giving an award/honor. To 'grant' is synonymous with 'give'. While 'to believe in' or 'imagine' may work in the first sentence, it no longer fits given the last paragraph, which implies that this honor is very real and not imaginary.

18. A. *Inference.* Language, or the art of writing, "arcs toward the place where meaning might lie" (lines 19-20) implies that literature aims to reach meaning/truth. Writing as a way to search for the truth also most closely mirrors what Bob Dylan was also known for doing with his music (line 12). The word 'arc' may bring to mind motion and beauty, but it is not essential to the meaning of the sentence. And though the author describes Toni Morrison's work as "lyrical", there is no evidence that she is a poet.

19. E. *Detail.* Bob Dylan described his hometown as a place where "you couldn't be a rebel – it was too cold" (lines 7-8), implying that he left in order to find a place where he could rebel expressively. The cold weather is referred to jokingly, and he did not mention getting sick from it. There is also no reference in the text of where he went to college, getting sick, or that people in his hometown were unappreciative of his talents.

20. D. *Tone/Mood/Style.* There are many phrases throughout the speech which are positive, and admiring: "incredible impact" (line 3), "redefining...music" (line 9-10), "words...were magical" (line 15), "proud to award" (lines 21-22). Though positive, the author does not refer to the artists as peers or with envy, but rather as an admiring fan: "The rest of us are lucky to be following along for the ride" (line 20). Though the author of the speech cracks jokes, his references to the artists' work are serious and not amused.

21. B. *Tone/Mood/Style.* The entire passage is trying to persuade readers to see Herbert Hoover's presidency from a different perspective. This persuasive tone is best captured in the last sentence of the introduction: "Yet, these arguments fail to highlight how Hoover's actions actually did alleviate America's greatest economic crisis" (lines 4-6). The passage uses factual evidence rather than emotional arguments, and while facts are present, they are used as supports for an opinion. The passage is the opposite of critical in its view of Hoover.

22. C. *Inference.* At the beginning of the passage, it states: "Many historians have a dim view of Herbert Hoover's presidency..." (lines 1-4). Using this context clue, one can infer that "lame duck" (line 20) supports a negative, or disdainful, view of Hoover. While the author of the passage is accepting of

Hoover's limitations, his views are opposite to those of the historians. There is no mention in the passage of Hoover's support staff.

23. B. *Main Idea.* The main argument is that Herbert Hoover was more involved in trying to alleviate the troubles of the Great Depression than many historians claim. This main idea is highlighted in the thesis statement: "these arguments fail to highlight how Hoover's actions actually did alleviate America's greatest economic crisis" (lines 4-6). While Herbert Hoover did see "homeownership as the beating heart of the American Dream" (lines 10-11), this is a detail that supports the larger main idea. The passage states that Herbert Hoover inherited the Great Depression, but argues that he did change it. There is no evidence in the passage to support the remaining answer options.

24. C. *Inference.* The word "alleviate" (line 5) is a synonym for words like relieve. The word relieve is mentioned in the previous sentence: "Historians claim that Hoover should have done more to relieve the economic disaster facing the country" (line 3-4). The words relieve and alleviate both suggest that Hoover was trying to reduce or ease the economic troubles of the Great Depression. He was not trying to allow, strengthen, or worsen the Depression. Though it may also mean 'getting rid of', the word destroy is not usually used in the context of "a crisis".

25. D. *Detail.* According to the passage, "Hoover's loss in the next presidential election meant that his policies did not have time to reach their full potential impact" (18-19). This tells us he was not re-elected. While "historians have a dim view of Herbert Hoover's presidency" (line 1), there is no information supporting the claim that he changed his policies, used up the gold reserve, or had to face oppositional politicians.

26. B. *Tone/Mood/Style*. The entire poem is about being "awake" in morning, or the "great red flower of dawn," affects different parts of the city. The narrator seems keenly aware of small details, and is conscious of how the dawn affects different parts of the city.

27. C. *Inference.* While the second stanza focuses on the sleepiness of the city interior, the third stanza focuses mainly on the busy nature of the "edges of the city." This stanza uses words verbs like "runs," "leaps," and "whirls" to emphasize the busy nature of the scene.

28. B. *Detail.* The poem describes the rising sun as the "great red flower of dawn" without using like or as. This makes this line a metaphor, not a simile. It compares two unlike things, but does not use "like" or "as." It is not an allusion because it does not make an indirect reference to a famous speech, text, person, or event. It is not personification because it does not give the sun human traits. And it is not an example of alliteration because the phrase does show repetition of a particular letter or sound.

29. D. *Main Idea.* While the first and third stanzas are mainly about the vibrancy and busyness of the morning, the second stanza focuses mainly on many city residents only going to sleep when the sun rises. The poem tells how sleep "oozes," "drowses," and "nods" over the "fragments of the night."

30. D. *Detail.* The word "flout" most likely means "dismiss" in this particular line. The two previous lines – "And, in shut rooms/Behind the lowered window-blinds" – hint that the "drawn white faces" are trying to dismiss, or order out or hide from, the morning light.

31. C. *Tone/Mood/Style.* The initial statement – "People should be more concerned about their daily water intake" – is an opinion statement. The article is trying to persuade people to be mindful of hydration. Also, it is not advertising a specific product (ex. Poland Spring), nor is it written in either a poetic, fictional, or journal entry form.

32. E. *Detail.* According to the passage, the damage from dehydration can also be internal, therefore not easily visible. It can damage "the kidneys and other organs" (lines 12 and 13). The other answer options are incorrect because it is not easy to stay hydrated (since you don't feel anything immediately when you begin to be dehydrated), the majority of your water intake should come from fluids, water accounts for a large percentage of your body weight, and thirst is a delayed sign of dehydration.

33. B. *Inference.* We know that pernicious (line 20) most likely means harmful because throughout the passage dehydration is associated with such damaging side effects as a "headache" (line 7), collapsing (line 8), fainting (line 9), overheating (line 10), "heart attack" (line 10), etc. We thus know that pernicious must not mean balanced, beneficial (good for you), or favorable (positive). Likewise, although the word "delayed" (line 11) is mentioned in the passage, it is a minor detail about the thirst mechanism, rather than the main point.

34. A. *Inference.* The author is most likely to discuss different strategies to help stay hydrated because he concludes with a call to "avoid the pernicious effects of dehydration" (line 20). The logical next step

would be to describe how to make it happen. All other answers have already been discussed as details in the passage or run counter to the details discussed in the passage.

35. B. *Main Idea.* The opening and concluding lines of the passage (lines 1 and 20) state the main idea of the article, which would most likely be in the focus of the headline. The article is mostly about the importance of hydration, since dehydration is so dangerous. Despite this, there are no examples in the text of how to stay hydrated. All other answer choices focus on details rather than the main idea.

36. D. *Detail.* To be "punctual" means to be prompt. The passage states that the children "would be early even if the train was punctual…" The implication here is that even if the train was on time, or prompt, the children would still be early because they've arrived at the station long before the train's set arrival.

37. D. *Inference.* The passage describes rain beating "slantwise against the windows of the booking office and the door of the General Waiting Room." Phyllis then describes the rain as "arrows of the foe striking against the battlements." Phyllis is employing a simile here, comparing the rain to "arrows" and the booking office and waiting room to "battlements."

38. C. *Detail.* The children begin their journey to the station by walking, but because the "rain stung sharply…the walk to the station was finished with a run." It can therefore be deduced that the children began running to the station because the rain made them uncomfortable. There is no mention of the children not having umbrellas, being afraid of being late, not being able to contain their excitement, nor being to do so by their mother.

39. B. *Inference.* Referring to the children's early arrival at the station, the passage mentions that "no doubt they would have been just as early if it had been a fine day." We can thus deduce that even if it were not raining, the children would arrive at the station just as early. Therefore, the weather would not have changed their plans. There is no mention in the passage about the children staying home, missing the train altogether, running the entire way to station, nor taking a scenic route.

40. D. *Inference.* The passage states that the hour spent waiting at the station "would be full of incident and of interest, for there would be two up trains and one down to look at…" Thus, the children will enjoy waiting at the station because they appreciate watching the train activity. There is no mention of the children having nothing else to do, wanting to stay dry, being excited to see their mother, nor rarely having a chance to be on their own.

Section 3 – Verbal

1. E. To "publish" something means to put something out, or "print," for the public to read. We usually "publish", or edit, a "book." Publishing can relate to the "journalism" industry. Do not confuse the word's synonyms for things that relate to or are simply associated with the word.

2. B. To "accompany" someone means to "join." Be careful not to confuse the action of doing something with the thing on which an action is performed. We can accompany a "friend," but that is not the definition of the verb. We know we're looking for a verb, which rules out "business," "friend," and "concern." This leaves us with "discover" or "join." The word also includes "com," a root word that means "together."

3. E. Something that is "normal" is "regular," or something that is average (or not out of the ordinary). "Compact" describes when things fit closely and neatly together, while "direct" means "straightforward". "Usually," or commonly might seem like the right answer, but it is an adverb, and we are looking for an adjective. This also rules out the verb "associate," which means to connect.

4. B. "Culture" is a shared collection of beliefs or social forms among a big group of people. Culture can be "rich," and "music" is an example of something cultural, but the best definition is "customs," which is a common way of doing something in a specific society.

5. C. To "attach means to put together or combine, which is to "conjoin." Notice the root word "con," which means "with." To "melt" is the opposite of putting a "thing" with something else, while "attachment refers to a noun (the thing that is attached).

6. E. A person's "behavior" is how someone acts in regard to his or her "attitude." Being "naughty" is an example of someone's behavior but not the definition. Though someone can make an "adjustment", or change, to their "behavior", but they do not mean the same thing.

7. D. A "preoccupation" is something that someone focuses on one thing, or a "fixation." Notice that both of the words have the suffix "-ation," which means to the action of something. This means that "preoccupation" means the action of being preoccupied, or completely focused on one thing, while "fixation" means the action of being fixed or completely set on something. "Obsessed" might seem like a

good answer, but it is a verb and we are looking for a noun. "Occupation" can refer to a "job," but this is not the same word as "preoccupation."

8. E. To "appreciate" something is to be grateful for something. When we "appreciate" someone, we "thank" them. Though we can "appreciate" someone by giving them a "gift," or present, that is not the only way to show appreciation.

9. B. A "schedule" is something that keeps track of everything you need to do and when you need to do it, or a "timetable." On a "schedule," you can have a dinner "reservation," or a certain time that you have set aside for something (in this case dinner) or a "holiday," which is a certain day to celebrate something, such as Fourth of July. If we break down "timetable" into "time" and "table," we can guess that it is a table that tells you times, which is what a schedule is.

10. D. When we have an "admission" to something, we are given "entrance," or access to a place. Do not get confused with commonly associated words. In this case, a "ticket" gives you "admission" into a "theater," but it does not give the definition.

11. C. A "layer" is a sheet, or "coating," of something that covers a surface. "Lay" means "to put" and the suffix "-er" means "the process of", which makes the definition: the process of putting or covering something. A "layer," like a coat, can provide "warmth," but not all layers must provide warmth.

12. A. Something that is "bewildering" is "confusing," or something that is unclear. Do not be tricked by seeing familiar words in unfamiliar ones. In this case, "wilderness," which refers to an area that has not been touched by humans, does not mean "bewildering." While something "abnormal," or something that is not common, can be confusing, it is not always the case..

13. E. A "chart" is a "diagram," which displays "information" that can be easily read. Remember, we are looking for the best definition and not words that are associated with the word. In this case, "information" can be displayed in a "chart" (from which a conclusion could be drawn), but it is not a synonym. A "pie" chart is an example of a chart.

14. A. To "assign" means to "designate," or to give someone a task to do. The most common examples are when teachers "assign" students "homework" and when bosses "assign" employees "paperwork" to do. In this case, the "homework" and the "paperwork" is the task that has to be done.

15. A. When there is a "deficiency," there is not enough of something, or "lack." For example, when someone has a "vitamin" deficiency, he or she does not have enough of a certain vitamin. The prefix "de" means to reduce. In this example, a person's body has reduced vitamins. "Missing" is an adjective, while "deficiency" is a noun (a state of being).

16. E. "Likewise" means in the same way, or "similarly." To be "like" something means to resemble something or to be similar. The suffix "-wise" means in the direction or manner. The definition then means to be in a similar manner. We can eliminate "discreet," which is an adjective, and "minimum" and "agreement," which are nouns, because we are looking for an adverb. "Almost" means not quite or close, and it is not analogous.

17. A. A "compulsion" is a "small desire." The prefix "com" means together or with. The root word "pul" means an urge or a desire. By using process of elimination, the only choice with desire is A.

18. C. An "author," or "writer," is a person who writes something that is read by others. An author typically writes books or articles are published for an audience. Again, do not be tricked by the words that are associated with "author." In this case, "book," "library," and "autograph" are all words that are commonly associated with "author." While an "author" can "autograph," or sign, a "book" in a library, we are looking for the definition.

19. A. A "doctrine" is a set of beliefs. In this case, the closest word in meaning is "saying," which might embody a set of beliefs. To be "lenient" is to be easy-going. Don't let "doc" fool you into thinking that it has something to do with health, like a doctor. "Doc-" actually means to "teach," in Latin, like the word "doctrine" or "docent." This is a challenging word, so use it as an opportunity to learn a new root word or saying!

20. A. Something that is "fictitious" is fabricated, or "made up." The root word "fic" means "make," like in "prolific" (someone good at making things). Fiction can be "entertaining", but this is subjective, and not a definitive characteristic.

21. D. A "code" is a "password," or a series of letters or symbols used for protecting something secret or personal. We can "enter" a "password" or "code," but it does not mean the same thing. After eliminating

all the verbs, we are left with "sum" or "password." The "sum" of something is the result of the addition of two or more things or numbers.

22. C. When something is "deliberate" it is on purpose, or "intentional." The word "intention" derives from the word "intent," which means with a purpose. A "jury" can "deliberate," or consider things seriously, which might be confused with "argue." While deliberate can be a verb and a noun, the best synonym is "intentional" and not "argue," because we can consider things carefully without arguing.

23. C. "Text" is a group of "words." While you may think of a "handy" (useful) or messages on your "phone," none of the choices best represent this definition. We communicate, or give and take information from others (perhaps "friends," perhaps not), through "text," or "words." When we "delete" something, we are erasing or getting rid of it.

24. C. A "survey" is a set of questions, or a "poll," that are asked to learn something. A person who takes a "survey," or "poll," is giving an "answer," or a response. These answers are the "result," or something that comes out of an action, of the survey. A "state," or a certain area under one government, may ask its people whether it needs better schools. A "survey" can also be a "source," or something to support research.

25. A. An "absence" is when something or someone is missing or away from a place. The best definition is "vacancy," which means unoccupied or empty. The prefix "ab" means "away." A "student" can have an "absence" from "school" when he or she is sick, but these are words closely associated with the word and not the definition. "Disappear," which means to might be a good word, which means to fade away, but it is a verb and not a noun.

26. B. "Compensation" is a "payment" that is given to someone in exchange for something else. To "comp" someone is to provide something. The suffix "ation" means the act or process of. Therefore, "compensation" is the act of providing something. For example, a job provides "compensation", or "payment" for work, in the form of a salary.

27. B. When something is "considerable" it is big, or "large." "Considerate" looks similar to "considerable," but it means "polite" or careful. When someone has a "considerable" amount of wealth, it means they have a lot, or a large sum, of money.

28. E. A prejudice is a thought formed in advance a "pre-" (before) "judgement" ("jud-"). This is akin to a "conception" (concept or idea) that has been formed in advance ("pre-"). Notice that "-ion" always signals a noun, which is what "prejudice" is.

29. C. To "beseech" means to "beg," or to ask someone passionately for something. The prefix "be" is an intensifier, which means it makes things more dramatic or important. In this case, the most dramatic or intense verb is "beg," which is the best answer. This is a challenging word, so use it as an opportunity to learn a new root word or saying!

30. A. Something that is "unpredictable" is not sure, or "unstable." While there is "guessing" when something is "unpredictable," we are looking for an adjective. Something that is "achievable" is something that can be reached, which does not reveal the correct definition of "unpredictable." To "abduct" means to take, which is also a verb and not the right answer. "Knowable," is when you are sure of something, which is the opposite of "unpredictable."

31. C. The moment of "birth" leads to the beginning of "life", so this is a cause/effect analogy. Similarly, neglecting a place can lead to it becoming shabby. While a painter creates art, and a script is a creative product, they are not in matching fields; a painter does not generally create scripts.

32. C. An officer is saluted, so this is a noun/verb analogy. Similarly, a future is envisioned. While a castle may be attacked, the words are presented in reverse order from the original pair.

33. C. Many "teammates" are a part of a "team", so this is a part/whole analogy. Similarly, many "seeds" are part of a "watermelon".

34. A. "Rain" is a less extreme version of "downpour", which means this is a degree/intensity analogy. Similarly, "strong" is a less extreme version of "almighty", or all powerful. "Fee" to "payment", "part" to "segment", and "estimate" to "guess" are all synonym analogies, which is the incorrect structure.

35. D. "Inarticulate" means unclear speaking skills (the prefix "in-" negates the stem, "articulate", which means good speaker). It is opposite to "fluent", which means this is an antonym analogy. Similarly, "massive" and "minute" (tiny) are opposite descriptors of size. "Surprise" and "gift" would work for an association analogy, but they are not antonyms.

36. E. Glue is used to bind things together, so this is a <u>function/object</u> analogy. Similarly, axes are used to hack things apart. Models may be inspirational, but "inspirational" is not a verb.
37. D. A photographer uses a camera to take photographs, so this is an <u>individual/object </u>analogy. Similarly, a musician uses his/her instrument to make music. While a hermit is alone, "alone" is not a noun.
38. C. A mirror is used to create a reflection, so this is a <u>purpose/object </u>analogy. Similarly, polish is used to make an object gleam. To sanitize and to clean are synonyms.
39. B. Textbooks are used to study, so this is a <u>function/object</u> analogy. Similarly, a ladder is used to climb. While a budget is used to limit spending, "limitation" does not fit as its function.
40. C. A breeze or light wind is the less extreme version of squall, or storm. That means this is a <u>degree/intensity</u> analogy. Similarly, "knowledgeable" is the less extreme version of "omniscient", which means "all knowing". "Squeeze" and "twist" are different motions, and cannot be compared by degrees.
41. E. An announcer uses an amplifier to make announcements, so this is an <u>individual/object</u> analogy. In their job, stylists use combs to style hair. While some stylists may use their imaginations in designing a style, imagination is not a tangible object.
42. D. "Morose" means the same thing as "gloomy", so this is a <u>synonym</u> analogy. "Tremendous" shares the same meaning as "immense". While the other options could be described as tremendous, they do not mean the same thing (i.e. you could have tremendous wealth, but wealth means having money, and not a large amount).
43. D. "Illustrated" is the past tense of the verb "illustrate", so this is a <u>grammar</u> analogy. Similarly, "anticipated" is the past tense of the verb "anticipate". Though "formed" is the past tense of "form", the order is reversed from the original structure.
44. A. Birds produce eggs, so this is a <u>cause/effect</u> analogy. Similarly, lanterns produce light. Watts describe the amount of light a bulb can create, but it is not a product of bulbs.
45. B. "Engineering" is a type of career, which means this is a <u>type/kind</u> analogy. Similarly, "English" is a type of language. A jungle may be a type of wilderness, but it is presented in a reversed order from the original structure.
46. E. "Insignificant" means the same thing as "unimportant", so this is a <u>synonym</u> analogy. "Malign" and "malevolent" mean the same thing: evil. "Phonic" means relating to speech sounds, but does not mean the same thing as "spoke".
47. D. A hotel houses guests, so this is a <u>definition</u> analogy. Similarly, a barn houses livestock. While a barn may feel safe, it does not "house" safety.
48. E. "Elated", or extremely joyful, is the opposite of feeling miserable. As an <u>antonym</u> analogy, the best match is "permanent" to "temporary". "Inquisitive" (curious) and "irritable" are different feelings, but not opposite ones.
49. A. "Luckiest" is the superlative form of the adjective lucky, so this is a <u>grammar</u> analogy. Similarly, "hungriest" is the superlative form of "hungry". "Care" is either a verb or noun and not an adjective, and "carefully" is not its superlative form.
50. A. A quilt is composed of many patches, so this is a <u>part/whole</u> analogy. Similarly, a highway is composed of several lanes. While one many have more than one role to memorize, "role" is to "memorize" is a noun/verb analogy.
51. B. A meeting may be planned, so this is a <u>noun/verb</u> relationship. Similarly, a package may be delivered. "Fantasy" and "delusion" are closer to the synonym structure.
52. D. Inspiration leads to ideas, so this is a <u>cause/effect</u> analogy. Similarly, an emergency can lead to panic. "Dire" is a descriptor and not the effect of emergencies.
53. B. A megaphone is used to protest, so this is a <u>purpose/object</u> analogy. Similarly, a box is used to contain things.
54. D. A typist uses a keyboard to type, so this is an <u>individual/object</u> analogy. Similarly, a singer uses a microphone to sing on stage. A villain may be evil, but evil is not a tangible object used by the villain.
55. E. "Inexcusable" means the same thing as "unforgiveable", so this is a <u>synonym</u> analogy. One meaning of "partial" is to prefer something, so it means the same thing as "biased". Though "retort" and "witty" are often associated, "retort" means to say something in response, and may or may not be "witty".

56. E. "Angry" is a less extreme version of "furious", so this is a <u>degree/intensity</u> analogy. The more extreme version of "sad" would be "inconsolable". "Upset" is synonymous to "sad", and is not more extreme in degree.

57. D. Seasoning is used to "enhance" food, so this is a <u>definition</u> analogy. Similarly, a "spice" is used to "flavor" food. Salt cannot be used to pepper food.

58. E. A mosquito is a type of insect, so this is a <u>type/kind</u> analogy. Similarly, geometry is a type of math. A dish is not a type of bowl; they are different types of tableware.

59. A. A king rules a country, so this is a <u>definition</u> analogy. Similarly, a mayor rules the city. A governor rules a state, not the world.

60. E. Woman is the singular form of women, so this is a <u>grammar</u> analogy. Similarly, man is the singular form of men. Manly is an adjective, not the plural version of man.

Section 4 – Quantitative

1. E. *Algebra – Interpreting Variables.* The number 5 is being multiplied by the entire expression within the parentheses, which is 10 minus *n*, or the difference of 10 and *n*. Therefore, the entire expression is 5 times the difference of 10 and *n*.

2. B. *Algebra – Multi-Step Word Problems.* Mrs. Smith is 36 years old, which is 4 × Maya's age. Maya is, thus, $\frac{1}{4}$ Mrs. Smith's age. $\frac{1}{4}$ × 36 = 9; Maya is 9 years old. Bob is 2 years older than Maya, so he is 9 + 2 = 11 years old.

3. A. *Numbers – Percents.* To find percent change, plug the new and original values into the equation $\frac{new-original}{original}$: $\frac{8,000-12,000}{12,000} = \frac{-4,000}{12,000} = \frac{-1}{3}$ = –0.333… = $33\frac{1}{3}$% decrease.

4. E. *Measurement – Time & Money.* The exchange ratio of ivory to pearls is 3:4. The exchange ratio of pearls to garnets is 6:7. Both ratios contain terms representing pearls: 4 and 6. Since 12 is the least common multiple of 4 and 6, we can change the ratio of ivory to pearls to 9:12 and the ratio of pearls to garnets to 12:14. Then a ratio of ivory to pearls to garnets can be constructed as 9:12:14. Thus, the ratio of ivory to garnets is 9:14 which can be converted to 36:56.

5. D. *Numbers – Decimals.* 0.0083 is the least since both its tenths and hundredths digits are zero. 0.015 is next to least since its tenths digit is zero but its hundredths digit is one. 0.02 also has a tenths digit of zero but a hundredths digit of 2. The tenths digit of 0.34 is 3, and the tenths digit of 0.4 is 4, so the former is less than the latter but greater than 0.02.

6. E. *Statistics – Compound Events.* Using the Fundamental Counting Principle, the total number of possible orders is 5 × 3 = 15.

7. D. *Algebra – Interpreting Variables.* Use substitution to find which expression has the greatest value. $m + n^2$ is correct because $1 + 3^2 = 1 + 9 = 10$.

8. A. *Algebra – Multi-Step Word Problems.* Ming received 3 × 35,000 = 105,000 votes. Adding Alicia's 35,000 votes yields a total of 140,000 votes for Ming and Alicia. If every voter selected one of the candidates, then Marco received 250,000 – 140,000 = 110,000 votes.

9. A. *Numbers – Whole Numbers.* Select two sample integers, such as 2 and 3, and use process of elimination to find the correct solution. 2 + 3 = 5, which is odd. 2 – 3 = –1, which is negative, not positive. With consecutive integers, one must be even, so their product cannot be odd. $\frac{2}{3}$ is not greater than 1, nor is $\frac{3}{2}$ less than 1. A is the only correct option.

10. B. *Pre–Algebra – Ratios & Proportions.* Dan will work a total of 21 hours from Monday through Wednesday. If he makes 32 dollars in 3 hours, he makes seven times that, 224 dollars, in 21 hours.

11. D. *Algebra – Multi-Step Word Problems.* The Reilly family spent 2 × $2.50 = $5.00 on hot dogs and 3 × $.75 = $2.25 on pretzels. The total spent on soda and pretzels was $5.00 + $2.25 = $7.25. Since the stand only sells hot dogs, pretzels, and soda, the Reillys must have spent $13.25 – 7.25 = $6.00 on soda. Since each cup of soda costs $1.50, the Reillys bought $6.00 ÷ $1.50 = 4 cups of soda.

12. D. *Numbers – Basic Computation.* 5,432 + 6,789 = 12,221. Subtracting 3,443 from 12,221 yields 8,778. For an easier approach which avoids some borrowing and carrying, you can first subtract 3,443 from 6,789 to obtain 3,346. Then, add 3,346 to 5,432 and obtain 8,778.

13. C. *Numbers – Decimals/Fractions/Percents*. Converting the fractions $\frac{1}{6}$ and $\frac{1}{2}$ into decimals yields 0.166… and 0.50, respectively. 0.25 is the only decimal part in the answer choices that is between 0.166… and 0.50 so Jason's height could be 50.25.

14. C. *Data Analysis & Probability – Circle Graphs*. According to the circle graph, 40% of students walk to school. To find 40% of the 450 students total, convert 40% into the decimal 0.4 and multiply by 450: 0.4 × 450 = 180.

15. C. *Numbers – Fractions*. If 2 students each drink $\frac{1}{3}$ of the regular milk, together they drink $\frac{1}{3}$ × 2, or $\frac{2}{3}$ of the gallon. If 4 students each drink $\frac{1}{5}$ of the chocolate milk, then together they drink $\frac{1}{5}$ × 4, or $\frac{4}{5}$ of the gallon. Add $\frac{2}{3} + \frac{4}{5}$ to find the total gallons they drink. $\frac{2}{3} + \frac{4}{5} = \frac{10}{15} + \frac{12}{15} = \frac{22}{15}$, or $1\frac{7}{15}$.

16. D. *Numbers – Fractions*. To find the number of students who take French, multiply 150 by $\frac{1}{5}$ to get 30. Similarly, to find the number of students who take Spanish, multiply 150 by $\frac{1}{3}$ to get 50. The number of students who take either French or Spanish is therefore 30 + 50, which equals 80.

17. C. *Data Analysis & Probability – Bar Graphs*. There are 26 tomato plants and 18 squash plants. 26 – 18 = 8.

18. D. *Data Analysis & Probability – Interpreting Line Graphs*. Students who use social media for 3 hours get 8 hours of sleep, while students who use it for 5 hours get 5 hours of sleep. 8–5 = 3 hours.

19. D. *Numbers – Fractions*. In this problem, the key word "of" indicates multiplication. To find the number of cans that are orange soda, multiply 40 by $\frac{1}{8}$.

20. C. *Measurement – Area, Perimeter & Volume*. A square is a rectangle with 4 congruent sides. The area of a square = s^2, the length of one side squared. 100 cm² = s^2 so s = 10 cm (since 10 × 10 =100). Thus, the square's four sides are each 10 cm long. Its perimeter is the sum of the lengths of the four sides. P = 4 × 10 cm = 40 cm.

21. D. *Geometry – Pythagorean Theorem*. Since the triangle formed by a diagonal is a right triangle, we may use the Pythagorean Triple (5, 12, 13) to find the width of the rectangle: w = 5. The area of the rectangle is: $A = l × w$ = 12 × 5 = 60 square units.

22. C. *Numbers – Basic Computation*. Use long division. When 93 is divided by 12, the quotient is 7 and the remainder is 9. Bring down the 6 and divide 96 by 12 which is 8. Therefore, the final quotient, when 936 is divided by 12 is 78.

23. A. *Geometry – Circles*. Plugging 21.98 for C and 3.14 for π into the equation $C = πd$ yields 21.98 = 3.14d. Divide both sides by 3.14 to solve for d to obtain d = 21.98 ÷ 3.14 = 7. The radius is half of the diameter, so 7 ÷ 2 = 3.5.

24. C. *Numbers – Place Value*. Of all the first terms, 23.95 has the least value, and multiplying by 0.1 reduces it further to 2.395. The next lowest value equations, 2,395 × 0.01 and 2,395 ÷ 100, are both equal to 23.95, which is greater than 2.395.

25. D. *Data Analysis & Probability – Histograms*. 20%, or $\frac{1}{5}$, of Fort Riley residents are over 60 and under 81. 4,000 people × 20% = 4,000 × $\frac{20}{100}$ = 4,000 × $\frac{1}{5}$ = 800 total people.

Section 5 – "Experimental"

1. E. Inference. The word "hailed" has several different meanings. One refers to precipitation, but that does not make sense in context. Another refers to the action of calling out or waving to someone (like a taxicab driver). The final one refers to being praised or acknowledged as being something.

2. D. Detail. The passage uses the phrase "go electric" to describe Dylan's decision to play an electric guitar instead of his traditional acoustic guitar. This was a significant change in instruments for Dylan. While this change led to booing from the audience, "go electric" simply describes Dylan's action, not the response.

3. E. Detail. The author claims that "there are different accounts of what happened at the festival." The implication here is that not everyone agrees about what happened at the Newport Folk Festival. There is no indication that Dylan never intended to play an electric guitar, that Dylan did not care about the booing, that albums sales were lower, nor that Dylan wanted to be seen as a rock n' roll musician.

4. C. Inference. In comparing instruments typically associated with folk music and rock n' roll music, the author claims that rock n' roll was "a very progressive genre." This suggests that folk music was more traditional than folk music, as "traditional" is the opposite of "progressive." We don't have information that supports the idea that it was because of Dylan that the electric guitar became popular. It says nothing about folk music fans being generally negative, nor does it claim anything about the popularity of the folk genre as a whole, or when it became popular.

5. A. Inference. The passage claims that Dylan not only was recognized as a leader of the folk music revival, but also suggests that his switch to the electric guitar made people worry that the revival would come to a "screeching halt." It can thus be inferred that Dylan was a very influential figure, since only one who is influential could make such an impact. The passage does not claim that Dylan did not care about his fans, was underappreciated, was unhappy with folk music, nor that he was regarded as a rock n' roll icon. There's no mention that he was concerned more with money than art.

6. E. "Sympathy" is a feeling someone has when others are suffering. We show "sympathy," or "kindness," to someone when he or she is sad. The prefix "sym-" means "together", and the root word pathos means "feeling." Together, the parts make up "feeling together," or "feeling for another." "Emotion" is too vague, and could refer to positive or negative feelings.

7. A. When there is a "complication," or "obstacle," there is something that has gotten in the way of a goal or has made things harder to accomplish. A "complication" makes a task "difficult," or hard, but "difficult" is an adjective and not a noun, which is what we are looking for. The suffix "–ation" means the process of. In this case, complication means the process of complicating, or making something harder.

8. C. To "concentrate," or to focus on, means to "pay attention." When we "concentrate," we might "close our eyes," but that is an example, not the definition. The suffix "–ate" in this instance makes the word a verb. The prefix "con" means "with." To "concentrate" means to focus with a lot of intensity, or "pay attention."

9. A. "Compassionate" and "empathetic" both mean "being sensitive of others' feelings", so this is a synonym analogy. Similarly, "brilliant" and "luminous" both mean "bright". "Messy" and "immaculate", which means "clean", are antonyms, which is the incorrect structure.

10. E. An ice skater skates in a rink, so this is a definition analogy. Similarly, a child plays in the park. Although a hockey player could skate in a stadium, the order is reversed from the original structure.

11. B. A programmer uses a computer to write code, so this is an individual/object analogy. Similarly, a nurse uses a stethoscope when working with patients. Though a receptionist uses a phone in his/her work, the order is reversed from the original structure.

12. D. *Numbers – Whole Numbers.* Since $\sqrt{x}$ is between 9 and 10, x must be between 92 = 81 and 102 =100. Of the answer choices, 93 is the only value between 81 and 100.

13. E. *Pre–Algebra – Ratios & Proportions.* We'll set up a proportion with the number of boys in the numerator and the number of girls in the denominator. So 3÷4 = x÷56. Cross multiplication yields 4x = 168. Solve for x to get x = 42.

14. E. *Pre–Algebra – Unit Analysis.* Since 1 hour is equal to 60 minutes, then $2\frac{1}{4}$ hours is equal to $2\frac{1}{4} \times 60$ = 135 minutes. The total length of both movies, then is 115 + 135 = 250 minutes. Divide by 60 to find the number of hours: 4 hours with a remainder of 10 minutes.

15. C. *Measurement – Time & Money.* Subtracting the weekly cost ($30) from the amount Peter paid ($48), we know that Peter paid $18 extra for fruits and vegetables. $18 divided by $3 is 6.

16. D. *Geometry – Coordinate Planes.* The library is 10 units up and 10 units to the right of the bank, so the most direct route is 20 units distance. You can use the axes as a guide for counting units or count along the path.

Quantitative Reasoning & Mathematics Achievement
Number Concepts & Operations

Place Value

1. E. Since the 9 is in the 4th place to the left of the decimal point, it is in the thousands place. Therefore, its value is nine thousand.
2. B. To find $\frac{1}{100}$ of 82,159, we can to multiply $\frac{1}{100}$ and 82,159. First, rewrite $\frac{1}{100}$ as the decimal 0.01. Then, ignore the decimals and multiply 82,159 × 1 = 82,159. Next, count the total number of decimal places in the factors: there are 0 decimal places in 82,159 and 2 decimal places in 0.01 for a total of 2 decimal places. Therefore, your answer should have 2 decimal places.
3. D. Since the number must be less than 7,264, the digit in the tens place must be less than 6. 5 is the largest digit that is less than 6.
4. C. When rounding numbers, digits 0 through 4 tell us to round down, and digits 5 through 9 tell us to round up. Therefore, 5.79, 5.82, 5.76, and 5.78 each round to 5.8 when rounding to the nearest tenth.
5. D. Since the ones place is the first place to the left of the decimal, 7 is in the ones place in the number 927.46.
6. E. First, ignore the decimals and multiply 47,901 × 1 = 47901. Next, count the total number of decimal places in the factors: there are 3 decimal places in 47.901 and 3 decimal places in 0.001 for a total of 6 decimal places. Therefore, your answer should have 6 decimal places.
7. A. First, rewrite 10^3 as 1,000 and multiply by 4.95 to obtain 4,950. Use process of elimination to determine which expression is equal to 4,950, which is 0.495×10^4.
8. C. In the number 6.051, the value of the digit 5 is 5 hundredths, or 0.05. Use process of elimination to determine which expression is equal to 0.05, which is 0.5 × 0.1.
9. B. Since 7 is in the 2nd place to the right of the decimal point, it is in the hundredths place. Therefore, the 7 has a value of seven hundredths.
10. E. The problem is not asking us to multiply 6,000 by 0.1; it is asking which of the answer choices can be multiplied by 0.1 to result in an answer of 6,000. To solve, try multiplying each answer choice by 0.1. The fastest way of multiplying any number by 0.1 is to simply move the decimal one place to the left. When 60,000 is multiplied by 0.1, the answer is 6,000.
11. D. In the number 459.21, the value of the digit 9 is 9 ones, or 9. Use process of elimination to determine which expression is equal to 9, which is 0.9 × 10.

Decimals

1. D. First, add 4.2 and 3.5 and obtain 7.7. Then subtract 0.8 from 7.7 to obtain 6.9.
2. D. To avoid negatives, let's work with the positive terms first, 1.2 and 8.8. Adding 1.2 and 8.8 yields 10. Since 5.3 is negative, subtract 5.3 from 10 to obtain 4.7.
3. C. 64 × 25 is 1,600, but since there are a total of two decimal places, the decimal point must be moved two places to the left, turning 1,600 into 16.
4. B. 28 × 125 is 3,500, but since there are a total of two decimal places, the decimal point must be moved two places to the left, turning 3,500 into 35.
5. E. 12 × 25 = 300, when all decimal points are ignored. There is a total of three digits after decimal points in this product, so the decimal point must be moved three spaces to the left; hence, 300 turns to 0.3.
6. E. Rewrite the expression 50.4 ÷ 0.042 by multiplying denominator and numerator by 1,000, yielding $\frac{50,400}{42}$. This quotient is equal to 1,200.
7. D. 0.5 equals $\frac{1}{2}$. Cubing $\frac{1}{2}$ means cubing the numerator and the denominator, which yields $\frac{1}{8}$. As a decimal, $\frac{1}{8}$ is equivalent to 0.125.
8. B. 0.3 × 0.6 = 0.18, which is less than 0.2, not greater than 0.2. All the other answer choices are true.
9. D. Since 0.49 equals $\frac{49}{100}$, the square root of this number is obtained by taking the square root of both denominator and numerator. This yields $\frac{7}{10}$, which is 0.7 in decimal form.
10. D. Rewrite this expression from 0.525 ÷ 3.5 to 525 ÷ 3,500 by multiplying numerator and denominator by 1,000. Reduce this fraction to $\frac{15}{100}$, which is 0.15.

11. C. 28 × 28 = 784. There are two digits after decimal points, so the decimal point must be moved two spaces to the left from the end of 784, resulting in 7.84.
12. A. Remember to line up the decimals properly. Perhaps it helps to write 67.5000 – 0.0576. Proceed like you would when you subtract positive integers.

Fractions

1. E. Use process of elimination. $\frac{3}{6}$ reduces to $\frac{1}{2}$; $\frac{3}{9}$ reduces to $\frac{1}{3}$; $\frac{6}{10}$ reduces to $\frac{3}{5}$; $\frac{12}{15}$ reduces to $\frac{4}{5}$; and $\frac{12}{18}$ reduces to $\frac{2}{3}$.

2. B. First, determine the greatest common factor of 12 and 72, which is 12. Then, divide the numerator and denominator by 12 to reduce the fraction. $\frac{12}{72} = \frac{12 \div 12}{72 \div 12} = \frac{1}{6}$.

3. E. First, find the lowest common denominator for 5 and 4, which is 20. Convert $\frac{1}{5}$ into $\frac{4}{20}$ by multiplying the numerator and denominator by 4; similarly, $\frac{3}{4}$ becomes $\frac{15}{20}$ when the numerator and denominator are multiplied by 5. $\frac{4}{20} + \frac{15}{20} = \frac{4+15}{20} = \frac{19}{20}$.

4. D. First, find the lowest common denominator for 3 and 6, which is 6. Convert $\frac{1}{3}$ to $\frac{2}{6}$ by multiplying the numerator and denominator by 2. $\frac{2}{6} + \frac{5}{6} = \frac{2+5}{6} = \frac{7}{6}$, or $1\frac{1}{6}$.

5. C. First, multiply the fractions within the parentheses: $-\frac{1}{2} \times \frac{2}{7} = -\frac{2}{14}$, which reduces to $-\frac{1}{7}$. Next, multiply $\frac{1}{3} \times -\frac{1}{7} = -\frac{1}{21}$.

6. A. First, multiply the fractions within the parentheses. $\frac{3}{5} \times \frac{1}{3} = \frac{3}{15}$ which reduces to $\frac{1}{5}$. Next, multiply $\frac{1}{8} \times \frac{1}{5} = \frac{1}{40}$.

7. A. First, find the lowest common denominator for 5 and 6, which is 30. Convert $\frac{1}{6}$ into $\frac{5}{30}$ by multiplying the numerator and denominator by 5; similarly, convert $\frac{1}{5}$ into $\frac{6}{30}$ by multiplying the numerator and denominator by 6. Then, subtract: $\frac{5}{30} - \frac{6}{30} = \frac{5-6}{30} = -\frac{1}{30}$.

8. C. There is 1 whole block and 2 half blocks shaded. $1 + \frac{1}{2} + \frac{1}{2} = 2$. So, there are 2 shaded blocks out of 5 total blocks which, as a fraction, is $\frac{2}{5}$.

9. B. To find the area of the first portion of the wall that Samantha painted, multiply 120 ft² by $\frac{1}{2}$. $120 \times \frac{1}{2} = 60$ ft². She then paints $\frac{1}{4}$ of the remaining section, so multiply 60 ft² by $\frac{1}{4}$ to get 15 ft². In total, she has painted 60 ft² + 15 ft² = 75 ft². To find out how much area is left to paint, subtract 75 ft² from 120 ft²: 120 – 75 = 45 ft².

10. E. Multiply the fractions in the order they are written. $\frac{1}{4} \times \frac{1}{2} = \frac{1 \times 1}{4 \times 2} = \frac{1}{8}$. $\frac{1}{8} \times \frac{2}{3} = \frac{1 \times 2}{8 \times 3} = \frac{2}{24}$, which reduces to $\frac{1}{12}$.

11. C. To compare these numbers most easily, convert them all into the same format, such as percentages. $\frac{1}{5} = 20\%$. 0.21 = 21%. $\frac{1}{2} = 50\%$. 0.45 = 45%. Now, you can compare the numbers and place them in order of the smallest percentage to the largest: 19%, 20%, 21%, 45%, 50%, 87%.

12. D. 3.4 as a fraction equals $3\frac{4}{10}$, or $3\frac{2}{5}$. To find the total number of fifths, convert the mixed number into an improper fraction, which is $\frac{17}{5}$. Therefore, there are 17 fifths total in 3.4.

13. C. Cross multiply to obtain 1 × y = 2 × 5 which yields y = 10.

14. D. One method to solve for is to cross multiply to obtain 4 × 21 = 7× x which yields $7x$ = 84. Divide both sides by 7 to solve for x: x = 12.

15. C. First, convert each mixed number to have the same denominator. Since the lowest common denominator is 9, convert $4\frac{1}{3}$ to $4\frac{3}{9}$. Then, add the two whole numbers to obtain 6 and add the two fractions to obtain $\frac{5}{9}$.

16. B. Invert the divisor fraction into its reciprocal, which is $\frac{1}{5}$, and multiply $\frac{15}{8} \times \frac{1}{5} = \frac{15}{40}$. This simplifies to $\frac{3}{8}$.

17. D. Invert the divisor fraction into its reciprocal, which is $\frac{3}{14}$ and multiply $\frac{21}{4} \times \frac{3}{14}$. We can cancel out the common factor 7 from 21 and 14 to get $\frac{3}{4} \times \frac{3}{2}$. Multiply numerators and denominators to get $\frac{9}{8}$.

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Percents

1. B. First, translate the question into the equation $x = 18\% \times 25$. Next, rewrite the percent as a decimal $x = 0.18 \times 25$. Then solve by evaluating 0.18×25 to obtain $x = 4.5$

2. C. First, translate the question into the equation $24\% \times 75 = x$. Next, rewrite the percent as a decimal $x = 0.24 \times 75$. Then solve by evaluating 0.24×75 to obtain $x = 18$.

3. D. This problem can be solved by setting up and solving two equations. Translate the first part of the question into the equation $20\% \times n = 80$. Then rewrite the percent as a decimal, $0.20n = 80$, and solve for n by dividing both sides by 0.20: $n = 80 \div 0.2 = 400$. Next translate the second part of the question into the equation $x = 5\% \times n$. Substitute 400 for n, rewrite the percent as a decimal, and then evaluate to solve for x: $x = 0.05 \times 400 = 20$.

4. B. First, translate the question into the equation $8 = 40\% \times n$. Next, rewrite the percent as a decimal: $8 = 0.40n$. Then solve by dividing both sides of the equation by 0.4: $n = 8 \div 0.4 = 20$.

5. E. First, translate the question into the equation $40 = 25\% \times x$. Then rewrite the percent as a decimal, $40 = 0.25x$, and solve for x by dividing both sides by 0.25: $x = 40 \div 0.25 = 160$.

6. B. This problem can be solved by setting up and solving two equations. Translate the first part of the question into the equation $x = 20\% \times 50$. Then rewrite the percent as a decimal and evaluate to find x: $x = .20 \times 50 = 10$. Next translate the second part of the question into the equation $n = x\% \times 50$. Substitute 10 for x: $n = 10\% \times 50$, rewrite the percent as a decimal, and then evaluate to solve for n: $n = 0.10 \times 50 = 5$.

7. D. First, translate the question into the equation $120 = x\% \times 80$. Next, divide each side by 80: $120 \div 80 = x\%$ to obtain $x\% = 1.5$. Rewrite the decimal as a percent to get $x = 150$.

8. B. First translate the question into the equation $60 = 125\% \times x$. Then rewrite the percent as a decimal $60 = 1.25x$, and solve for x by dividing both sides by 1.25: $x = 60 \div 1.25 = 48$.

9. C. First, translate the question into the equation $30 = x\% \times 45$. Next, divide each side by 45: $30 \div 45 = x\%$ to obtain $x\% = 0.\overline{6}$. Rewrite the decimal as a percent to get $x = 66\frac{2}{3}$.

10. D. To increase 80 by 75%, find 75% of 80: $0.75 \times 80 = 60$ and then add to 80: $80 + 60 = 140$. To decrease 140 by 20%, find 20% of 140: $0.20 \times 140 = 28$ and then subtract from 140: $n = 140 - 28 = 112$.

11. D. 6 left-handed students were 30% of the total students. Translate this into an equation to obtain $6 = 30\% \times n$. Rewrite the percent as a decimal: $6 = 0.3n$. Divide both sides by 0.3 to solve for n: $n = 6 \div 0.3 = 20$ students total.

12. C. First, we want to find 15% of $300. Translate this into an equation to obtain $x = 15\% \times 300$. Rewrite the percent as a decimal: $x = 0.15 \times 300$ to get $x = \$45$. Then add the $45 to the original bill to get $300 + $45 = $345.

13. E. $1,000 as a percent of the total budget is $\frac{1,000}{4,000} = \frac{1}{4} = 0.25 = 25\%$. According to the circle graph, 25% of the budget was spent on the School Dance.

14. E. Add the number of people who chose mustard, 18, to the number of people who chose ketchup, 22, to get $18 + 22 = 40$ people. As a percent, 40 people out of 50 people total is $\frac{40}{50} = \frac{4}{5} = 0.8 = 80\%$.

15. D. The chart has $5 \times 5 = 25$ squares total. There are 5 squares with odd numbers (1, 3, 5, 7, and 9 are the odd numbers) and 6 squares with letters. As a percent, 5 + 6 squares out of 25 total is $\frac{11}{25} = \frac{44}{100} = 44\%$.

16. B. 90 seventh graders were 60% of the total students. Translate this into an equation to obtain $90 = 60\% \times n$. Rewrite the percent as a decimal: $90 = 0.60n$. Divide both sides by 0.6 to solve for n: $n = 90 \div 0.6 = 150$ students total.

17. B. To find the sale price, first calculate 40% of $150: $0.40 \times 150 = \$60$ and then subtract from the original price: $150 - $60 = $90. To increase by 40%, find 40% of $90: $0.40 \times 90 = \$36$ and then add to $90: $90 + $36 = $126.

Decimals/Fractions/Percents

1. C. To convert a percent into a fraction, write the percent divided by 100: $9\% = \frac{9}{100}$.

2. B. First, rewrite the decimal 0.8 as $\frac{8}{10}$ which reduces to $\frac{4}{5}$. The expression is now $\frac{2}{4} \div \frac{4}{5}$. Next, rewrite as multiplication by changing the division sign to a multiplication sign and using the reciprocal of the second fraction. $\frac{2}{4} \div \frac{4}{5} = \frac{2}{4} \times \frac{5}{4}$. Mulptiply to get $\frac{2 \times 5}{4 \times 4} = \frac{10}{16} = \frac{5}{8}$.

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3. C. Converting the fractions $\frac{1}{3}$ and $\frac{2}{3}$ into decimals yields 0.33... and 0.66..., respectively. 0.44 is the only answer choice between 0.33... and 0.66...

4. C. Since the word "of" indicates multiplication, the question is asking us to multiply 20% and $\frac{1}{10}$. Convert 20% into the fraction $\frac{20}{100}$ which reduces to $\frac{1}{5}$. Evaluating $\frac{1}{5} \times \frac{1}{10}$ gives us $\frac{1 \times 1}{5 \times 10} = \frac{1}{50}$.

5. D. $\frac{7}{10}$ = 0.7 = 70%, not 75%.

6. E. The easiest way to solve this problem is converting the percents and fractions into decimals. 20% = 0.20 and 45% = 0.45. Of the answer choices, only $\frac{1}{3}$, which equals 0.33..., is between 0.20 and 0.45.

7. A. Convert all the fractions into decimals to compare. $\frac{2}{5}$ = 0.4 and $\frac{5}{6}$ = 0.83... From least to greatest, the order of the decimals is: 0.2, 0.4, 0.45, 0.83... or 0.2, $\frac{2}{5}$, 0.45, $\frac{5}{6}$.

8. A. If the dinner bill was split 5 ways, then each person paid $\frac{1}{5}$. Converting $\frac{1}{5}$ into a decimal yields 0.20 which is equivalent to 20%.

9. E. Rewrite the two decimals as fractions. The decimal 2.2 is the fraction $\frac{22}{10}$ or $\frac{11}{5}$, and the decimal 0.8 is the fraction $\frac{8}{10}$ or $\frac{4}{5}$. Working left to right, first multiply $\frac{8}{11} \times \frac{11}{5}$. We can cancel out the common factor 11 to get $\frac{8}{1} \times \frac{1}{5} = \frac{8}{5}$. Dividing $\frac{8}{5} \div \frac{4}{5}$ is equivalent to multiplying $\frac{8}{5} \times \frac{5}{4}$. We can cancel out the common factor 4 from the 8 and the 4 and cancel out the 5's to get $\frac{2}{1} \times \frac{1}{1}$ = 2.

10. D. Rewrite the two decimals as fractions. The decimal 1.5 is the fraction $\frac{15}{10}$ or $\frac{3}{2}$ and the decimal 1.2 is $\frac{12}{10}$ or $\frac{6}{5}$. Working left to right, first flip the divisor fraction and multiply, so $\frac{3}{2} \div \frac{9}{20} = \frac{3}{2} \times \frac{20}{9}$. After common factors 3 and 2 are cancelled out, we are left with $\frac{1}{1} \times \frac{10}{3}$ which equals $\frac{10}{3}$. Next, multiply $\frac{10}{3} \times \frac{6}{5}$. After common factors 3 and 5 are cancelled out, we are left with $\frac{2}{1} \times \frac{2}{1}$ = 4.

11. D. Rewrite the decimal 0.35 as the fraction $\frac{35}{100}$ which reduces to $\frac{7}{20}$.

12. B. Convert all the fractions into decimals to compare. $\frac{1}{2}$ = 0.5 and $\frac{2}{3}$ = 0.66 ... From least to greatest, the order of the decimals is: 0.1, 0.23, 0.5, 0.66... or 0.1, 0.23, $\frac{1}{2}$, $\frac{2}{3}$.

13. C. Converting the fractions $\frac{1}{2}$ and $\frac{3}{5}$ into percents 50% and 60%, respectively. 57% is the only answer choice between 50% and 60%.

14. C. $\frac{1}{3}$ = 0.33 ..., not 0.3.

15. D. If the cost of the football game is evenly split 6 ways, then each person will pay $\frac{1}{6}$. Converting $\frac{1}{6}$ into a decimal yields 0.16 ... which is equivalent to $16\frac{2}{3}$%.

16. D. Rewrite the two decimals as fractions. The decimal 8 is the fraction $\frac{8}{1}$, and the decimal 0.2 is the fraction $\frac{2}{10}$ or $\frac{1}{5}$. Working left to right, first multiply $\frac{3}{4} \times \frac{8}{1}$. We can cancel out the common factor 4 from the 4 and the 8 to get $\frac{3}{1} \times \frac{2}{1} = \frac{6}{1}$. Dividing $\frac{6}{1} \div \frac{1}{5}$ is equivalent to multiplying $\frac{6}{1} \times \frac{5}{1}$ = 30.

Whole Numbers

1. B. Finding a number that is halfway between two numbers is the same as finding the mean, or average, of the numbers. Find the average of the two numbers first by adding 37 and 49 to obtain 37 + 49 = 86 and then dividing the sum by 2 to obtain 86 ÷ 2 = 43.

2. D. You could use long division and process of elimination to find the correct solution, but the quickest way is using the divisibility trick: a number is divisible by 6 if it is divisible by 2 (or even) and also divisible by 3 (if the sum of the digits is divisible by 3). We can eliminate 117 and 145 since they are odd and therefore not divisible by 2. Since 1+2+4 = 7 is not divisible by 3, it can be eliminated. Also, 1+3+0=4 is not divisible by 3 and can be eliminated. Since 1+3+8 = 12 is divisible by 3, 138 is divisible by 3. Since 138 is divisible by both 2 and 3, it is divisible by 6.

3. D. Round each number to the nearest multiple of 10 to estimate the value. $\frac{99 \times 100^2}{8 \times 13}$ rounds to $\frac{100 \times 10,000}{10 \times 10}$, which equals $\frac{100,000,000}{100}$. Divide to simplify the fraction to get 10,000.

4. B. Round each number to the nearest multiple of 10 in order to estimate the value. $\frac{48 \times 3^2}{98 \times 101}$ rounds to $\frac{50 \times 10}{100 \times 100}$, which equals $\frac{500}{10,000}$. Reduce the fraction to get $\frac{1}{20}$.

5. C. Prime numbers are defined as natural numbers that have exactly two distinct factors: 1 and itself. 2, 5, 7, 11, and 17 are prime numbers. A is incorrect because 1 is not a prime number.

6. C. Prime numbers are defined as natural numbers that have exactly two distinct factors: 1 and itself. 37, 41, 43, 47, and 53 are prime numbers.

7. C. Set up 2 inequalities to find a range of numbers that could equal x. Since x divided by 30 is greater than 7, write the inequality $\frac{x}{30} > 7$. Similarly, since x divided by 30 is less than 8, write the inequality $\frac{x}{30} < 8$. Solve for x in each inequality by multiplying each side by 30 to eliminate the fraction. Since $x > 210$ and $x < 240$, the only choice is 220.

8. B. If n divided by 9 equals a whole number, then n must be evenly divisible by 9, or a multiple of 9. The only choice that is evenly divisibly by 9 is 117. A quick way to determine if a number is divisible by 9 is to check if the sum of the digits is divisible by 9. Since 1 + 1 + 7 = 9 is divisible by 9, 117 is divisible by 9.

9. B. In this equation, 21 is added 4 times, which is the same as multiplying 21 by 4, or 21 × 4. If 21 × 4 is equal to 4 times the variable k, then k must equal 21.

10. D. Set up an equation for the sum of the integers: $x + (x + 1) + (x + 2) = 138$. Combine like terms to obtain $3x + 3 = 138$. Isolate the variable by first subtracting 3 from both sides to obtain $3x = 135$ and then dividing both sides by 3 which yields $x = 45$. To find the value of the greatest of these three integers, plug in 45 to $(x + 2)$, which represents the greatest number: 45 + 2 = 47.

11. B. We can eliminate 6, 12 and 960 since they are not factors of 64. 64 is not a factor of 120. The only choice left is 8.

12. B. If 69 divided by p has a remainder of 3, then 69 is not evenly divisible by p so the answer cannot be 3. However, 69 minus 3 is evenly divisible by p. 69 – 3 = 66. The only remaining choice that evenly divides into 66 is 11.

Order of Operations

1. B. Following the PEMDAS order of operations, first evaluate within the parentheses: 10 – 8 = 2. Then, multiply 3 × 2 = 6. Then, add 6 + 6 = 12.

2. C. Following the PEMDAS order of operations, first evaluate the division operation: 20 ÷ 2 = 10. Next, evaluate the addition and subtraction from left to right: 100 – 15 + 10 = 85 + 10 = 95.

3. E. Converting 0.5 into a fraction gives $\frac{1}{2}$. $\left(\frac{1}{2}\right)^3 = \left(\frac{1}{2}\right)\left(\frac{1}{2}\right)\left(\frac{1}{2}\right) = \frac{1}{8}$. Converting $\frac{1}{8}$ into a decimal yields 0.125.

4. B. Following the PEMDAS order of operations, first evaluate within the parentheses: 9 – 7 = 2. Then, evaluate the exponent 2^3, which equals 8. Last, evaluate the subtraction 8 – 10 = –2.

5. B. Following the PEMDAS order of operations, first evaluate the exponents 3^2, which equals 9, and 4^2, which equals 16. Next, evaluate multiplication and division from left to right, which is (4 × 9 ÷ 12) = 36 ÷ 12 = 3. Evaluate addition last: 2 + 3 + 16 = 21.

6. B. First, evaluate the exponent: $3^2 = 9$. Then, evaluate multiplication and division from left to right: 14 ÷ 2 × 9 = 7 × 9 = 63. Lastly, evaluate addition and subtraction from left to right: 7 + 63 – 8 = 70 – 8 = 62.

7. B. Following the PEMDAS order of operations, first evaluate the parentheses and then the exponent, $(8 – 9)^3 = (–1)^3 = –1$. Next, evaluate multiplication and division from left to right, 6 × (–1) ÷ 2 = –6 ÷ 2 = –3. Lastly, add 7 + (–3) = 4.

8. E. Evaluate each expression individually using the PEMDAS order of operations: 10 – 5 × 9 = 10 – 45 = –35 and $17 – 2^4 = 17 – 16 = 1$. The product of –35 and 1 is –35.

9. D. Following the PEMDAS order of operations, first evaluate in the brackets by evaluating the parentheses and exponent: $(5 + 3)^2 = (8)^2 = 64$. Next, evaluate the multiplication operation within the brackets: 9 × 4 = 36. Then subtract 64 – 36 = 28. Lastly, multiply –2 by 28 to get –56.

10. E. Following the PEMDAS order of operations, first evaluate the parentheses and then the exponent, $(12 – 10)^2 = 2^2 = 4$. Then, solve for division within the parenthesis, 16 ÷ 2 = 8, and then addition, 8 + 4 = 12. Lastly, multiply 12 × 5 = 60.

11. E. First, plug in the values for x and y to get 46 + 3(7 + 4). Next, following the PEMDAS order of operations, evaluate the parenthesis: 46 + 3(7 +4) = 46 + 3(11). Then multiply to get 46 + 33. Lastly, add to get 79.
12. D. Evaluate the parentheses and exponents first. $(8 \div 2)^2 = (4)^2 = 16$, and $(5 - 3)^2 = (2)^2 = 4$. Then, divide and multiply from left to right. $16 \div 4 \times 2 = 4 \times 2 = 8$.

Pre–Algebra

Ratio and Proportions

1. B. We can create the proportion, $\frac{3}{4} = \frac{36}{x}$, where x equals the original number of mice. Cross–multiply to get 144 = 3x, so x = 48. 48 – 36 = 12, the number of mice who are still in the house.
2. D. Two squirrels eat 8 acorns in 4 days. First, keeping the number of days constant at 4 while doubling the number of squirrels present means that 4 squirrels could eat 16 acorns in 4 days. If 72 acorns must be eaten, the proportion to set up is $\frac{16}{72} = \frac{4}{x}$, where x represents the number of days it takes 72 acorns to be consumed by these 4 squirrels. 16x = 288, so x = 18.
3. D. Let x be the number of questions David answered correctly. $\frac{86}{100} = \frac{x}{50}$; cross–multiplication yields 100x = 4300, so x = 43.
4. C. Let x represent the number of cups Robert drank. $\frac{3}{2} = \frac{144}{x}$, so 288 = 3$x$, and x = 96.
5. B. For every eight pounds of meat, 5 are eaten by the lion, and 3 are eaten by the tiger. Therefore, $\frac{3}{8}$ of the total pounds of meat are eaten by the tiger. $\frac{3}{8} = \frac{x}{168}$, so 8$x$ = 504, and x = 63.
6. D. $\frac{3}{(2+3)} = \frac{x}{80}$. 3(80) = 5$x$, so 5$x$ = 240, and x = 48.
7. D. Statement D is false. The ratio of adults to total humans is 5:8 or any multiple of 5:8. 1:2 does not equal 5:8.
8. E. If one taco costs $4.80, then five tacos cost $24. If that is the same price as 2 enchiladas, then one enchilada costs $12.
9. C. To find $\frac{1}{12}$ of any number, divide that number by 12. 18,000 divided by 12 equals 1,500.
10. B. $0.68 = \frac{68}{100}$, since 6 is in the tenths place and 8 is in the hundredths place, and the decimal terminates in two digits after the decimal point. The necessary proportion is $\frac{68}{100} = \frac{x}{25}$. 1,700 = 100$x$, so x = 17.
11. C. $\frac{7}{8} = \frac{x}{100}$. 700 = 8$x$, so x = 87.5.
12. C. $\frac{15}{27} = \frac{x}{108}$. Reduce the fraction $\frac{15}{27}$ to $\frac{5}{9}$, and then set $\frac{5}{9} = \frac{x}{108}$. 540 = 9$x$, so x = 60.
13. E. $\frac{5}{6}$ of the cats were sleeping. $\frac{5}{6} = \frac{x}{48}$, where x is the number of sleeping cats. 240 = 6x, so x = 40.
14. E. If 60 deer escaped, that means 60 = $\frac{3}{5}$ of the total number of deer hunted by the jaguar. 60 = $\frac{3x}{5}$, so 300 = 3x, and x = 100.
15. D. We can create the proportion $\frac{3}{7} = \frac{21}{x}$, where x equals the total number of matches Carla played. Cross-multiply to get $147 = 3x$, so $x = 49$.
16. B. For every five walls that are painted in a day, Kevin paints two of them and Brian paints three. Therefore, $\frac{2}{5}$ of the total walls are painted by Kevin. $\frac{2}{5} = \frac{x}{95}$, so $5x = 190$, and $x = 38$.
17. C. For every 3 candy bars you buy, you get one for free. You can set up the proportion $\frac{1}{3} = \frac{x}{12}$, where x represents the total number of free candy bars if you bought 12. Cross-multiplication yields $3x = 12$, and $x = 4$ candy bars for free.
18. B. Simplifying the ratio to just dogs and gerbils gets us 2:1. With this we can set up the proportion $\frac{2}{1} = \frac{16}{g}$ where g represents the total number of gerbils at the pet store. Cross-multiplication yields $2g = 16$, so $g = 8$ gerbils.
19. C. If 5 judges can give a perfect score of 75, we can divide 75 by 5 to get 15 as the perfect score of one judge.
20. B. To find $\frac{1}{5}$ of any number, divide that number by 5. 800 divided by 5 equals 160.

21. C. First, you need to find the ratio of questions answered correctly to the total number of questions, which is 7 to 9. Then, we can set up the proportion $\frac{7}{9} = \frac{x}{36}$ where x represents the total number of questions answered correctly. Cross-multiplication yields $9x = 252$, so $x = 28$.

22. B. $0.28 = \frac{28}{100}$, since 2 is in the tenths place and 8 is in the hundredths place, and the decimal terminates in two digits after the decimal point. The necessary proportion is $\frac{28}{100} = \frac{x}{25}$. $700 = 100x$, so $x = 7$.

23. B. $\frac{3}{8} = \frac{x}{48}$ where x represents the total number of students who completed the assignment. Cross-multiplication yields $8x = 144$, so $x = 18$.

24. E. If Leo missed 10 field goals, that means $10 = \frac{2}{7}$ of the total number of field goals he attempted. $10 = \frac{2x}{7}$, so $70 = 2x$, and $x = 35$.

Sequences, Patterns and Logic

1. A. There are six terms in the sequence. Every term that is a multiple of six will be the circle (the sixth shape shown above). The multiple of six nearest to 13 is 12; the 13th term will be the next term after the circle, which is the star (because the sequence repeats).

2. E. If an even integer is multiplied by 4, the product will be a multiple of 4. If that product is then divided by 2, the quotient will still be even. The other answer options all include a multiple of 4 (which will remain an even integer), added to or subtracted by an odd integer. This will always result in an odd integer.

3. C. An odd integer plus 1 is even. An even integer multiplied by 3 is still even. And an even integer divided by 2 will always yield an integer.

4. D. The difference between the first and second terms is 3. The difference between the second and third terms is 6. The difference between the third and fourth terms is 12. Each subsequent term, the difference from the previous term doubles. Thus, the difference between the fourth and fifth terms must be 2×12 = 24 and the term must be 23 + 24 = 47.

5. B. The difference between the first and second terms is 4. The difference between the second and third terms is 6. The difference between the third and fourth terms is 8. Each subsequent term, the difference from the previous increases by 2. Thus, the difference between the fourth and fifth terms must be 8 + 2 = 10 and the term must be 26 + 10 = 36.

6. B. There are five terms in the series. Every term that is a multiple of five will be green (the fifth term in the series). The multiple of five nearest to 87 is 85; the 87th term will be two terms after green, which is pink (because the sequence repeats).

7. E. The first seven numbers in the series are: 3, 4, 7 (which is 3 + 4), 11 (which is 4 + 7), 18 (which is 7 + 11), 29 (which is 11 + 18) , 47 (which is 18 + 29).

8. E. The difference between subsequent terms alternates between 1 and $-\frac{1}{2}$. The difference between the last two terms shown ($8\frac{1}{2}$ and 8) is $-\frac{1}{2}$, so the difference between 8 and the next term will be 1. $8 + 1 = 9$.

9. E. The numerators and denominators of each subsequent term increase by the same increment which means that the difference between the numerator and denominator will always remain the same. The difference between the numerator and denominator for each term shown is 3, so x must be 3 more than 22.

10. D. Do not assume that the pattern repeats in sets of 7. Each subsequent shape in the pattern is a 90° counter–clockwise rotation of the previous term. Simultaneously, every third shape is bold. The 11th shape will be the same as the 7th term, as it has rotated 90° four times (for a total of 360°), and it will not be bold.

11. E. There are six terms in the sequence. Every term that is a multiple of six will be the star (the sixth shape shown above). The multiple of six nearest to 29 is 30; the 29th term will be the term before the star, which is the square.

12. E. If ◯ equals 20, and △ plus ◯ = 45, then △ must equal 25. ◯ times △ equals ☐, so ☐ = 20 × 25 = 500.

13. D. Any negative number can be multiplied by -2 to produce a positive number. Any integer multiplied by 2 will result in an even number.

Estimation

1. C. $0.48 is about $0.50. Since $0.5 \times 4 = 2$, the best estimate for 4 pens is $2.00.
2. B. 32 is closer to 30 than 40, 19 is closer to 20 than 10, and 38 is closer to 40 than 30. Thus, the best estimate of the sum can be found by adding $30 + 20 + 40$.
3. D. We can round 89.5 up to 90 and 11.8 up to 12, then subtract $90 – 12$ to yield 78.
4. C. Rounded to the nearest $10, Shelby's purchases are $120, $230, and $110. The estimated total cost is $120 + $230 + $110 = $460.
5. D. Rounding the length in miles up to 6, and the number of feet in a mile to 5,000, yields $6 \times 5,000 = 30,000$.
6. B. The 208 boxes can be rounded to 200 and the 48 books in each box can be rounded to 50. The approximate number of books is $200 \times 50 = 10,000$.
7. C. Rounding the number of cases of water to 1,800 and the number of bottles per case to 10 yields $1,800 \times 10 = 18,000$.
8. B. Rounding up the number of students to 1,200 and the number of students who can fit on a bus to 60 yields $1,200 \div 60 = 20$.
9. D. The 18 ounces of flour can be rounded up to 20 and the 11 ounces of sugar rounded to 10. These can be added together to find the combine number of ounces per recipe: $10 + 20 = 30$. The 28 recipes can be rounded up to 30. To find the approximate total, multiply the number of ounces by the number of recipes: $30 \times 30 = 900$.
10. E. Rounding each to the nearest ten yields 100 words per minute and 120 minutes. Multiply to estimate: $100 \times 120 = 12,000$.
11. B. $216.38 can be rounded to $220, and 9 people can be rounded to 10, so $220 \div 10 = 22$. Be careful: there are 9 total diners; a common mistake is to round the bill and divide by 8, which is simply the number of friends who dined with Andrew!

Algebra

Interpreting Variables

1. D. You must multiply the values of 3 times a times b. Replacing a with 4 and b with 6 yields $3 \times 4 \times 6 = 72$.
2. A. The value of c can be written with the equation $c = d – 8$. To solve for the value of d, add 8 to both sides; d therefore must equal $c + 8$, or 8 more than c.
3. E. In this expression, the coefficient 6 represents the $6 that each jar of peanut butter costs; similarly, the 4 represents the $4 for each jar of jelly. The number of jars of peanut butter and jelly are therefore represented by x and y, respectively, since they are unknown variables. The y represents the number of jars of jelly.
4. C. A square has 4 equal sides. Since we are given one side of the square, we can multiply that by 4 to determine the perimeter, or the sum of 4 equal sides. 4 times $5a$ equals $20a$, and 4 times $–2$ equals $–8$. Therefore, $4(5a – 2) = 20a – 8$.
5. D. If the variable g represents the number of carton of eggs, then 12 times g represents the number of eggs that Ting bought in total.
6. E, A rectangle has 2 sets of equal sides. The length is 3 times the width, or $3(b + 5) = 3b + 15$. There are two sides that are $b + 5$, and two sides that are $3b + 15$. Summing these four sides together gives $b + 5 + b + 5 + 3b + 15 + 3b + 15 = 8b + 40$.
7. B. If Jennifer's age is represented by a, then Henry's age can be represented by $a + 5$, since he is 5 years older than Jennifer. If Todd is 9 years younger than Henry, you can take Henry's height, $h + 5$, and subtract 9, which yields $a + 5 – 9 = a – 4$.
8. A. Since Callie only has $500, she can only spend less than or equal to $500. Answer choices C and D can be eliminated. The cost of the chairs is represented by $70x$ because each chair costs $70. Since the table costs $150, together Callie can spend $70x + 150$, but the total must be less than or equal to 500. So, $70x + 150 \le 500$.
9. B. In this expression, the coefficient 4 represents the $4 that each hot dog costs; similarly, the 3 represents the $3 for each order of fries. The number of hot dogs and orders of fries are therefore represented by x and y, respectively, since they are unknown variables. The x represents the number of hot dogs Gus bought.

10. A. Since Rhonda currently has spent $62, she needs to spend at least $13 more dollars to reach her $75 goal and receive the discount. She can spend more than $13 and still receive the discount. Therefore, the number of dollars she needs to spend is greater than or equal to 13, or $d \geq 13$.

11. E. Since Matthew only has $100, he can only spend less than or equal to $100. Answer choices B and D can be eliminated. The cost of the seeds is represented by $2x$ because each packet costs $2. Since the bag of dirt costs $10, together Matthew can spend $2x + 10$, but the total must be less than or equal to 100. $2x + 10 \leq 100$.

12. B. Since Tyrone has at least 24 hangers in total, this means the number of hangers must be greater than or equal to 24. Answer choices C and E can be eliminated. The coefficient 6 represents the number of hangers that he has in each closet, and x represents the number of closets he has in his home. Therefore, in each of his closets, x, there are 6 hangers, which in total are greater than or equal to 24.

13. C. If Sally's height is represented by h, then Jimmy's height can be represented by $h + 5$, since he is 5 inches taller. If Betty is 3 inches shorter than Jimmy, you can take Jimmy's height, $h + 5$, and subtract 3, which yields $h + 5 - 3 = h + 2$.

14. E. The product of y and 7 can be written as $7y$. To find twice this product, you must multiply by 2.

15. D. 6 less than p can be written as $p - 6$. To find the product of p and $(p - 6)$, you must multiply them together.

16. B. Rewriting the expression without parentheses yields $8g \times 3 + 8g \times 7$. From here we can factor out an $8g$ from each term which yields $8g(3 + 7)$.

17. B. Combine like terms by adding the variables together. $-z + z + z + z = 2z$. Therefore, this simplified expression is equal to $18 + 2z$.

18. D. Answer choices B and E can be eliminated because when we distribute 10 and multiply by $700a$, we get $7{,}000a$, not $70a$ or $7a$. Each of the remaining answer choices has 0.1 outside the parentheses. When we distribute 0.1 over $(700a - 140)$ in choice D, we get $70a - 14$.

19. C. The difference of 8 and n can be written as $8 - n$, and the product of 3 and that expression can be written as $3(8 - n)$.

20. B. Distribute the negative in front of the parentheses to get $47 - p + 47 - p$. Combine like terms to get $98 - 2p$.

21. C. The sum of a number k and 4 can be written $(k + 4)$, and three times this is $3(k + 4)$.

22. C. Rewriting the expression without parentheses yields $5d \times 9 + 5d \times 7$. From here we can factor out an $5d$ from each term which yields $5d(9 + 7)$.

Solving Equations and Inequalities

1. C. Add y to both sides of the equation: $26 = 14 + y$. Subtract 14 from both sides: $y = 26 - 14 = 12$.

2. B. Isolate the variable by first subtracting 12 from both sides of the equation to obtain $4r = -16$. Next, divide both sides by 4 which yields $r = -4$. Remember that the quotient of a negative number and a positive number is negative.

3. D. Insert 6 in the position of p: $\frac{6+2}{6-2} = \frac{8}{4} = 2$.

4. B. Add $2v$ to both sides of the equation: $-6 = 12 + 2v$. Subtract 12 from both sides to isolate $2v$: $-18 = 2v$. Divide both sides by 2 to isolate v: $-9 = v$, or $v = -9$.

5. E. The quotient of two numbers is the result of division of the first number by the second. Start with the quotient of x and 10, or $\frac{x}{10}$. Next, subtract 2; *less than* indicates subtraction.

6. D. Shan gives x cookies to friends and relatives. He therefore has x fewer cookies than the original 30. To represent a decrease, subtract: $30 - x$ = number of remaining cookies.

7. B. $g > 0$, so eliminate answer choice A, which is less than 0. Subtract 3 from both sides to get $g^2 = 25$. To isolate g, take the square root of both sides. Remember that, since $g > 0$, there is only a positive solution. The positive square root of 25 is 5.

8. E. Apply the Distributive Property and multiply m by both $3m$ and 3. $m(3m) = 3m^2$ and $m(3) = 3m$ so $m(3m + 3) = 3m^2 + 3m$.

9. A. First, solve for j by subtracting 80 from both sides of the first equation to get $j = 140$. Evaluate $j - 60$: $140 - 60 = 80$.

10. E. Squaring each answer choice yields: $6^2 = 36$, $7^2 = 49$, $8^2 = 64$, $9^2 = 81$, and $10^2 = 100$. Since, $n^2 < 100$, n cannot equal 10.

11. B. Substitute 4 for j and -3 for k: $4(-3) - (4 + -3) = -12 - 1 = -13$.

12. C. Luanne had $25 + x$ candies and gave away 7. She ended up with $(25 + x) - 7 = 18 + x$ candies.

13. E. First, combine like terms: $2p - 3p = -p$ which yields the new expression: $p(6 - p)$. Use the distributive property and multiply both 6 and $-p$ by p: $p(6 - p) = 6(p) - p(p) = 6p - p^2$.

14. E. Substitute 12 for h: $\frac{(g-12)}{3} = 8$. Multiply both sides of the equation by 3 to obtain: $g - 12 = 24$. Add 12 to both sides of the equation, which yields $g = 36$.

15. B. First, solve for x by cross multiplying: $5x = 40$, $x = \frac{40}{5} = 8$. Next, substitute 8 for x in the second equation: $\frac{8+4}{2} = \frac{12}{2} = 6$.

16. C. Add x to both sides of the equation. Then, subtract 13 from 81 to get 68.

17. A. Subtract 24 from both sides of the equation. This gives $3k = -36$, Divide by 3 to get $k = -12$.

18. A. Plug in 1 for h. This gives $\frac{1+7}{1-3} = \frac{8}{-2} = -4$.

19. B. The product of x and 5 is $5x$ and 3 less than that means subtract 3 for $5x-3$.

20. D. Georgina has 27 bracelets. If she gives bracelets away, we are subtracting bracelets from the total. Here, the number of bracelets she gave away is b, so subtracting that from 27 gives $27-b$.

21. D. First, subtract 16 from both sides of the equation. This gives m2 = 9. Then, consider what positive number squared would equal 9. The answer is 3.

22. E. Multiply the term in front of the parentheses by each term in the parentheses. This is $(g \times 2g) - (g \times 3) = 2g^2 - 3g$.

23. C. Nessie has 14 flowers and buys f more. Add f to 14 to get $14+f$. Then, subtract the 6 flowers she gives to a friend. This gives $14-6+f = 8 + f$.

Multi–Step Word Problems

1. D. If there are x oranges, there are 3 times that number of apples, or $3x$ apples. If there are half as many oranges as bananas, then that means there are twice as many bananas as oranges, or $2x$ bananas. Thus, the ratio of apples: oranges: bananas is 3:1:2. There are $3x + x + 2x = 6x$ apples, oranges, and bananas. $6x = 72$; $x = (72 \div 6) = 12$. The fruit stand contains $(2 \times 12) = 24$ bananas.

2. C. Lin earns $50 and spends $25 every day. His net gain is ($50 – $25) = $25 per day. After 6 days, Lin has ($25 per day × 6 days) = $150, plus his original $300, which makes a total of $450. He gives ($\frac{1}{3}$ × $450) = $150 to his sister, so he has ($450 – $150) = $300 remaining.

3. B. The table is $n + 8$ feet wide. If the width is 10 feet, then $n + 8 = 10$, so $n = 2$, which represents the length. Therefore, the area is $2 \times 10 = 20$ square feet.

4. B. Abby bought two more muffins than Carlo, who bought 7, so Abby bought 9 muffins. Bess bought six fewer muffins than Abby, so Bess bought 3 muffins.

5. B. If each slice has 18 cherries, which is equal to $3s$, then s must equal 6. Since Jessica has s slices of pie and $s = 6$, she has 6 slices.

6. A. Convert minutes to hours; 30 minutes out of an hour, $\frac{30}{60}$ hours = $\frac{1}{2}$ hour. Speed × time = distance, so, after $\frac{1}{2}$ hour, Alexa travels (16 miles per hour × $\frac{1}{2}$ hour) = 8 miles. In the same period, Frank travels (13 miles per hour × $\frac{1}{2}$ hours) = 6.5 miles. Alexa cycles (8 – 6.5) = 1.5 miles farther than Bob in 30 minutes. Alternatively, the difference between Alexa's speed and Bob's speed is 16 – 13 = 3 miles/hour. (3 miles per hour × $\frac{1}{2}$ hours) = 1.5 miles.

7. A. The fifth-grade class ordered 6 boxes of pizza, with 8 slices per box. The total number of slices was (6 × 8) = 48. If the class consumed $\frac{3}{4}$ of the pizza, then ($\frac{3}{4}$ × 48 slices) = 36, so 12 slices were left for the fourth-grade class. Max ate $\frac{1}{6}$ of those 12 slices; ($\frac{1}{6}$ × 12) = 2 slices.

8. E. Average speed = (total distance/total time). Rochelle's total distance is (1.4 + 1.4) = 2.8 km. If it takes her 10 minutes to reach the post office, it takes her 2 × 10, or 20 minutes, to return home. Her total time is (10 + 20) = 30 minutes. 30 minutes = $\frac{30}{60}$ = .5 hour. Her average speed = total distance, 2.8 km, divided by total time, .5 hours. $\frac{2.8}{.5}$ = 2.8 × 2 = 5.6 km/hour.

9. A. $33 minus the $9 equipment fee equals $24, which means Dave made $24 dollars from his hourly rate alone. If Dave made $24 over three hours, he must have charged $24 ÷ 3 = $8 per hour.

10. A. If Sam paid with a $10 bill and received $5.20 in change, her total must have been $4.80. If four cans cost a total of $4.80, each can must have cost $4.80 ÷ 4 = $1.20.

The Tutorverse
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11. C. Abe and John have $420 combined, which is equal to 7s, so s must equal $60. Trisha has s dollars in her bank account and s = 60, so Trisha has $60 in her bank account.

12. B. If Ana spent n dollars, Chris spend n – 4 dollars ($4 less than what Ana spent). In total, they spent $30, or n – 4 + n dollars. Simplified, $30 = 2$n$ – 4, then $34 = 2$n$ and n = $17. If Chris spent n – 4 dollars, he spent (17) – 4 dollars, which equals $13.

13. B. If the Wolves and the Spartans have 28 team members combined, and they have m + 2 and m members respectively, then m + 2 + m = 28. Simplified, 2m + 2 = 28, and m = 13, so the Spartans have 13 members.

14. E. Grocery store Y has b + 6 bananas, which equals 36. Thus, b equals 30 bananas. If Grocery store X has b bananas, it has 30 bananas. Together, the two stores have 30 plus 36 bananas, which equals 66 bananas.

15. C. Amy has p pencils, which equals 12 pencils. If Liam has 6p pencils, he has 6(12) pencils, which equals 72 pencils. 72 minus 12 equals 60, so Liam has 60 more pencils than Amy has.

16. C. A sandwich costs d^2 dollars, which equals $16. The square root of 16 is 4, so d equals 4. Since a salad costs d dollars, it must cost $4.

17. C. A helmet costs d^2 dollars, which equals $36. The square root of 36 is 6, so d equals $6. If a bike light costs d dollars, it must cost $6. $36 minus $6 equals $30, so a helmet is $30 more expensive than a bike light.

18. C. If Tanya paid with a $20 bill and received $6.80 in change, the teas must have cost $20 – $6.80 = $13.20. If six teas cost a total of $13.20, each tea must have cost 13.20 ÷ 6 = $2.20.

19. D. A window is t + 3 feet tall, which equals 6 feet tall. Thus, t equals 3 feet. If the window is t feet wide, it must be 3 feet wide. The perimeter of a rectangle can be found using P = 2 × length + 2 × width, which in the case of the window is P = 2 × 6 feet + 2 × 3 feet, or 18 feet.

20. E. Define the number of parakeets Robert has as r parakeets. If Tom has four times as many parakeets as Robert, Tom has 4r parakeets. They have a total of r plus 4r parakeets combined which equals 60 parakeets. Simplified, they have 5r = 60 parakeets, so r equals 12. Since Tom has 4r parakeets, and r equals 12, Tom must have 4×12 = 48 parakeets.

21. A. Define the number of brownies Lia baked as n brownies. If Lia baked one third the number of brownies that Sean baked, then Sean baked three times as many brownies as Lia baked, or 3n brownies. They baked a total of 48 brownies, so n + 3n = 48. Simplified, 4n = 48 brownies, so n equals 12 brownies. If Lia baked n brownies, she must have baked 12 brownies.

22. D. Highway 202 is 3m – 6 miles long, which equals 6 miles. Thus, 3m – 6 = 6 and m = 4 miles. Since Highway 101 is m miles long, Highway 101 must be 4 miles long. Highway 303 is 6m – 18 miles long, or 6(4) – 18 miles long, which simplifies to 6 miles long. The lengths of Highways 101 and 303 combined is equal to 4 miles plus 6 miles which equals 10 miles.

23. C. If Donny gave his mother $10 for his lemonade–making materials and ended up with $50, he must have made a total of $10 + $50 = $60. If he received $60 by selling 20 cups of lemonade, each cup must have cost $60 ÷ 20 = $3.

Geometry

Pythagorean Theorem

1. B. Since the triangle is a right triangle, we may use the Pythagorean Theorem: $a^2 + b^2 = c^2$ where a and b are the legs of the triangle and c is the hypotenuse. Plugging in the lengths of the legs, 5 and 12, for a and b we obtain $5^2 + 12^2 = c^2$; $25 + 144 = c^2$; $169 = c^2$. Solve for c by taking the square root of each side to obtain c = 13. Another way to solve this by using the Pythagorean Triple (5, 12, 13).

2. C. We can solve this by using the Pythagorean Triple (3, 4, 5) and recognizing that 12 = 4 × 3 and 15 = 5 × 3 so the missing leg must be 3 × 3 = 9. The area of a triangle is: $A = \frac{1}{2} b \times h$. Plugging in 12 for b and 9 for h yields: $A = \frac{1}{2}(12) \times (9) = 6 \times 9 = 54$ square units.

3. C. Let's find WX by using the Pythagorean Triple (8, 15, 17); since YW is 8 and YX is 17, WX must be 15. Since the side lengths of triangle WYZ has the same values, WZ also equals 15. Since $XZ = WX + WZ$, XZ = 15 + 15 = 30.

4. A. Since the path creates two identical right triangles, we may use the Pythagorean Theorem: $a^2 + b^2 = c^2$ where a and b are the legs of the triangle and c is the hypotenuse. Plugging in the lengths of the legs, 6 and 8, for a and b we obtain $6^2 + 8^2 = c^2$; $36 + 64 = c^2$; $100 = c^2$. Solve for c by taking the square root of each side to obtain c = 10. Another way to solve this by using the Pythagorean Triple (3, 4, 5) and recognizing that 6 = 3 × 2 and 8 = 4 × 2 so the missing hypotenuse must be 5 × 2 = 10.

The Tutorverse
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5. B. Since the triangle formed is a right triangle, we may use a Pythagorean Triple. Since 20 = 5 × 4 and 16 = 4 × 4, we will use the Pythagorean Triple (3, 4, 5) to find the missing leg: 3 × 4 = 12.
6. C. Since the triangle formed by the diagonals are right triangles, we may use the Pythagorean Triple (7, 24, 25) to find the missing width: $w = 7$.
7. B. Since the triangle is a right triangle, we may use a Pythagorean Triple. Since 16 = 4 × 4 and 20 = 5 × 4, we will use the Pythagorean Triple (3, 4, 5) to find the missing leg: 3 × 4 = 12.
8. D. First, let's find AD by using the Pythagorean Triple (3, 4, 5) and recognizing that 15 = 5 × 3 and 12 = 4 × 3 so AD must be 3 × 3 = 9. Next, we'll find CD by using the Pythagorean Triple (5, 12, 13) so CD must be 5. Since $AC = AD + CD$, $AC = 9 + 5 = 14$.
9. D. Since the triangle formed by a diagonal is a right triangle, we may use the Pythagorean Triple (8, 15, 17).

Coordinate Plane

1. B. Quadrant III is the lower left quadrant on a coordinate plane. Therefore, the points will be in the form $(-x, -y)$.
2. C. Quadrant VI is the lower right quadrant on a coordinate plane. Therefore, the points will be located at $(x, -y)$. Note that the point (5, 0) is on the border of Quadrant IV but not inside it and is therefore incorrect.
3. E. The x–value is always first in an ordered pair. Point R is 6 units along the x–axis to the right of the origin, so the first point in the ordered pair is 6. The point is 4 units below the origin along the y–axis, so the y value is −4. Thus, the location of the pair is (6, −4).
4. B. The point (−2, −1) is 2 units to the left of the origin and 1 unit down. Point B is 5 units up from that point.
5. C. Quadrant IV is the lower right quadrant, so all points will be in the form $(x, -y)$. Quadrant III is the lower left quadrant, so all points will be in the form $(-x, -y)$. Quadrant II is the upper left quadrant, so all points will be in the form $(-x, y)$. And Quadrant I is the upper right quadrant, so all points will be in the form (x, y). Therefore, the correct answer will be in the form $\{(x, -y), (-x, -y), (-x, y), (x, y)\}$.
6. A. Angie's house is located at (−3, 5) on the grid (3 units to the left and 5 units above the origin).
7. E. Tim will have to cross both the x– and y-axis on the map. He travels 1 + 2 units down, then 8 + 7 = 15 units to the right, or 3 units south and 15 units east.
8. C. If point M is in the second quadrant, it is in the upper left quadrant, meaning the point will be located at $(-x, y)$. If point Q is in the third quadrant, it is in the lower left quadrant, meaning the point will be located at $(-x, -y)$. If the points are 6 units apart, then the point that is 3 units above the x–axis and the point that is 3 units below the y-axis will be 6 units apart.
9. D. Moving right 5 units moves point N to (−4, −3). Moving up 6 units moves the point to (−4, 3).
10. A. (−6, −4) and (−6, 5) are the two points that are farthest from one another. If you were to graph the points on a grid, these would be 9 points apart, on opposite ends of the line.
11. C. You can plot on a coordinate plane to solve or subtract from each coordinate: 1 − 3 = −2, and 6 − 2 = 4, so point F is located at (−2, 4).

Transformations

1. A. Reflecting a point through the origin changes the signs of both the original *x* and *y* coordinates. A reflection through the origin can also be described as a reflection across the *x*-axis, followed by a reflection across the *y*-axis; the former would relocate Point *O* to (–4, 2), while the latter would relocate it to (4, 2). The triangle would appear as follows:

2. C. Before the reflection, Vertex *G* is 3 units to the left of Vertex *J*, at (–5, 4). A reflection across vertical line segment *IJ* moves it 3 units to the right of Vertex *J* to (1, 4).

3. A. A reflection across the *x*–axis preserves the *x*–coordinates and changes the signs of the *y*–coordinates. Point *V*(–7, 7) moves to *V'* (–7, –7) and Point *W* (–1, 2) moves to *W'*(–1, –2).

4. C. Changing the *x*-coordinate from 4 to –2 requires moving the point 6 units to the left. There is only one answer choice that has that option.

5. A. If the rectangle is translated 4 units down, Vertex *J* will be located at (–6, –1), Vertex *K* at (–6, –6); Vertex *L* at (3, –6), and Vertex *M* at (3, –1). All four of these points are in Quadrants III (negative *x*, negative *y*) and IV (positive *x*, negative *y*) only.

6. E. The problem is only asking about point *S*, so we only need to rotate point *S*, not the entire shape. To rotate point *S* rotates 90 degrees clockwise about point *R*, draw a right angle using *RS* as the original side. The new line should be a vertical line that goes 4 units down from point R to (–2, –6).

7. E. Reflection across the *x*–axis relocates Vertex *Q* from (–3, 2) to (–3, –2), Vertex *R* from (–7, 6) to (–7, –6), and Vertex *P* from (–3, 6) to (–3, –6). A rightward shift of 10 units moves all points to Position 2: Vertex *Q* to (7, –2), Vertex *R* to (3, –6), and Vertex *S* to (7, –6).

8. B. Follow any point on the triangle. For example, at Position 1, Vertex *X* is at (–6, 9). When the triangle is reflected across the *y*–axis, *X* is relocated to (6, 9). When the triangle is rotated 90 degrees clockwise about Point *Z*, *X* moves to (6, 1).

9. B. The series of transformation is shown to the right. Position 2 shows Triangle *JKL* is rotated 90 degrees clockwise about point *K*. Position 3 shows it reflected across line segment *LK*.

10. D. Following a 90–degree counterclockwise rotation, the horizontal line segment that forms the top of the trapezoid becomes vertical and lies on the left, and the longer base on the bottom becomes vertical and lies on the right. The dark rectangle, originally near the left edge, is rotated downwards

11. B. The figure is rotated 180 degrees, but the black line and white oval are facing the wrong direction. The black line should be extending across the upper lobe, near the top, while the oval should be aligned horizontally.
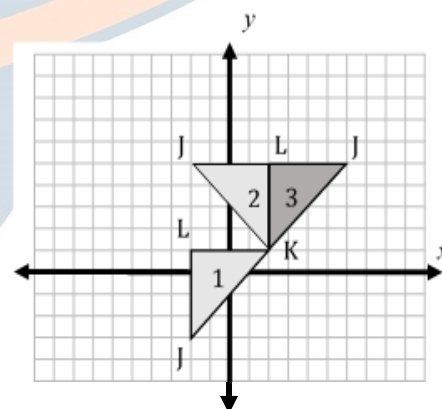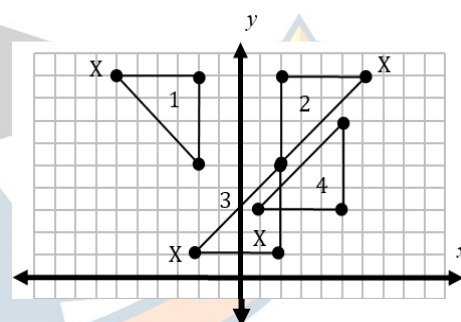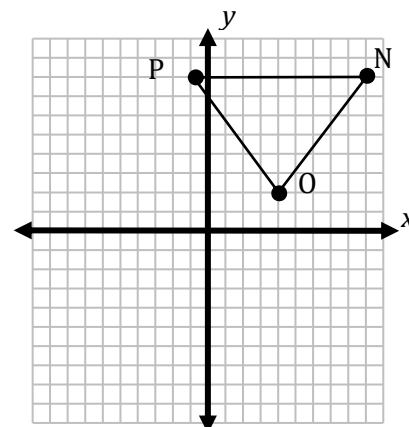
Circles

1. C. Since $C = \pi d = 10\pi$, $d = 10$. The radius is half of the diameter by definition, so $r = 10 \div 2 = 5$. Therefore, $A = \pi r^2 = 5^2\pi = 25\pi$.

2. B. If the area of the square is 64 in², then the length of a side must be $\sqrt{64 \text{ in}^2} = 8$ in. The diameter of the largest circle that can fit inside a square will also be 8 in. The radius is half of the diameter, so $r = 4$ in. The area of the circle is $\pi r^2 = \pi \times 4^2 = 16\pi$ in².

3. C. Since perimeter is 48 cm, the length of the side of the square must be 48cm $\div$ 4 = 12 cm. The diameter of the largest circle that can fit inside the square is also 12 cm. Using circumference formula, $C = \pi d$, we obtain $C = 12\pi$.

4. E. If the area of the square is 36 in², then the length of a side must be $\sqrt{36 \text{ in}^2}$ = 6 in. The diameter of the largest circle that can fit inside a square will also be 6 in. Using circumference formula, $C = \pi d$, we obtain $C = 6\pi$ in. A circumference larger than 6π in is not possible.

5. D. Since the radius of each ball is 9 in, the diameter of each is 18 in. In inches, the dimensions of the smallest possible bin are: 2(18) × 3(18) × 2(18) = 36 × 54 × 36. Divide each of those dimensions by 12 to get the number of feet: 3 × 4.5 × 3.

6. D. If the radius of the circle is 5 cm, then the diameter is 10 cm. The side of the square is also 10 cm and the area of the square is therefore (10 cm)² = 100 cm². The area of the circle is $\pi \times 5^2 = 25\pi$ cm². The area of the shaded region is the difference of the two areas: 100 – 25π cm².

7. E. Since the radius of each ball is 3 in, the diameter of each is 6 in. In inches, the dimensions of the smallest box are: 2(6) × 2(6) × 2(6) = 12 × 12 × 12.

8. E. If each point on the circumference of the circle is 4 inches from the center, then the radius is 4 inches. The longest line segment whose endpoints are on the circumference of the circle would be the diameter. Since the radius is 4 inches, the diameter would be 8 inches. 12 inches would not be possible.

9. B. Since $A = \pi r^2$, r^2 must be between 30 and 40. 36 is the only perfect square between 30 and 40 so setting $r^2 = 36$ gives us $r = 6$, and a diameter of 12. The other choices result in an area less than 30π or greater than 40π.

10. E. Since line segment *AB* does not pass through the center, the diameter must be longer than line segment *AB*. If the diameter is longer than 6, the circumference must be longer than 6π ($C = \pi d$). 7π is the only answer choice that is longer than 6π.

11. A. Since line segment *AB* does not pass through the center, the diameter must be longer. If the diameter is longer than 6, then the radius must be longer than 3. The area must therefore be larger than $\pi \times 3^2 = 9\pi$ and cannot equal 9π.

Two and Three Dimensional Shapes

1. E. The sum of the four interior angles of any shape with four sides (a quadrilateral) will equal 360°.
2. D. A pentagonal prism has two bases, both of which are pentagons, and five rectangular sides. A pentagon has 5 vertices; the two pentagons together have 10 vertices.
3. E. A heptagonal prism has two bases, both of which are heptagons, and seven rectangular sides. A heptagon has 7 edges, so the two bases together have 14 edges. The edges of the sides of the prism connect the 7 vertices of both bases. So there are 14 + 7 = 21 edges total.
4. E. A triangular prism has 2 triangular bases, and 3 sides, for a total of 5 faces. A cube and rectangular prism both have exactly six faces. A Triangular pyramid has four faces. A pentagon is not a three-dimensional shape and cannot be said to have any faces.
5. A. A triangular prism has five faces: two triangular bases and three sides. A rectangular prism, a trapezoidal prism, and a cube all have six faces: two bases and four sides. A pentagonal pyramid has six faces: its base and five triangular lateral faces.
6. D. The faces of a trapezoidal prism include both trapezoidal bases and four quadrilateral sides which includes rectangles, parallelograms, or squares.
7. D. The net displays the five faces of a triangular prism. Of the answer options, only the triangular prism has two triangles and three rectangular faces.
8. B. The polygon has four vertices, so it cannot be a triangle. The distance between the coordinates on top is less than the distance between the coordinates on bottom so it cannot be a parallelogram or a rectangle. Of the two trapezoids, the scalene trapezoid has one leg that connects to both bases at 90° angles, which would only be possible if two of the *x*-coordinates were equal.
9. E. The shape is a trapezoidal prism, with each base being a trapezoid. A cross section taken perpendicular to the base will produce a rectangle. Any rectangle is a parallelogram.
10. C. A rectangular prism can be constructed from this net. All rectangular prisms have 12 edges.

Spatial Reasoning

1. C. The figure shown is a combination of a trapezoid and a smaller, upside down isosceles triangle. A right triangle would not be the correct shape.
2. D. Each column represents 3 cubes. Counting from the cubes visible from the top, there are 6 columns. 6 × 3 = 18, therefore there are 18 cubes in all.
3. E. The trapezoid, cut in half by *QR* as a vertical line, would create two smaller quadrilaterals.

4. B. There are 20 ways to choose 3 objects from a group of 6. However, three combinations are illegal, since they involve three points on the same line. 20 – 3 = 17. The possible triangles are: *ABC*, *ABE*, *ABF*, *ACD*, *ACE*, *ADE*, *ADF*, *AEF*, *BCD*, *BCF*, *BDE*, *BDF*, *BEF*, *CDE*, *CDF*, *CEF*, and *DEF*. *ABD*, *AFC*, and *BEC* do not count.
5. D. Use the Pythagorean theorem. $8^2 + 15^2 = 289$. 289 is the square of 17.
6. E. Pre–Algebra – Spatial Reasoning. There are nine 1 × 1 rectangles, four 2 × 2 rectangles, and one 3 × 3 rectangle. There are also twelve 1 × 2 rectangles, six 1 × 3 rectangles, and four 2 × 3 rectangles. 9 + 4 + 1 + 12 + 6 + 4 = 36.

Measurement

Time and Money

1. C. $1\frac{1}{4}$ hours is the same as 1 hour and 15 minutes. One hour before 7:10 p.m. is 6:10 p.m. 15 minutes before 6:10 p.m. is 5:55 p.m.
2. D. $26 is divisible by 30¢ ($0.30) 86 times, with a remainder of 20¢. Because Lana cannot buy a portion of a pencil, the greatest number of pencils she can buy is 86.
3. C. Starting with the largest denomination, Regina takes two 25-cent coins, and still needs 21 cents. She takes two of the next largest coin (10-cent coin), and still needs 1 cent. For this, she takes one 1-cent coin. Therefore, the least number of coins Regina must take is 5 coins.
4. C. The exchange ratio of apples to clementines is 1:4. The exchange ratio of clementines to figs is 16:26 which can be reduced to 8:13. Both ratios contain terms representing clementines: 4 and 8. Since 8 is the least common multiple of 4, we can change the ratio of apples to clementines to 2:8 and use the reduced ratio of clementines to figs, 8:13. Then a ratio of apples to clementines to figs can be constructed as 2:8:13. Thus, the ratio of apples to figs is 2:13 which is equivalent to 6:39.
5. D. Subtracting the monthly cost ($55) from the amount Albert pays ($72.50), we know that Albert has paid $17.50 extra for premium channels. $17.50 divided by $2.50 is 7.
6. D. Twenty minutes before 3:05 p.m. is 2:45 p.m. $\frac{1}{4}$ of an hour, or 15 minutes, before 2:45 p.m. is 2:30 p.m.
7. D. Subtracting the flat rate ($26) from the amount Charlie charged ($65), we know that Charlie has charged $39 for the hours he spent mowing. $39 ÷ $6.50 = 6.
8. C. $6,000 is divisible by $350 seventeen times, with a remainder of $50. Because Kristina cannot buy a portion of a bookshelf, the greatest number of bookshelves she can buy is 17.
9. C. The store earned $246.50 from hats alone ($14.50 × 7 = $101.50). This means that the store earned $300.00 from scarves ($401.50 – $101.50 + $300.00). $300 ÷ 20 = $15.00, so each scarf costs $15.00.
10. C. If 22 tickets were sold individually, they would cost a total of $715 ($32.50 × 22 = $715). The group of 22 paid $545.25. $715 – $545.25 = $169.75, so the group received a discount of $169.75.

Area, Perimeter and Volume

1. C. Since Area = length × width, the width = area ÷ length = 48 m^2 ÷ 6 m = 8 m. Karl needs enough chicken wire to surround the garden, with a length equal to the garden's perimeter. Perimeter = $(2l + 2w)$ = 2 × 6m + 2 × 8m = 12m + 16m = 28m.
2. B. The perimeter is the sum of all the sides. Starting at the top side with length 3 and working around clockwise, we get 3 + 2 + 1 + 1 + 3 + 2 + 1 + 1 = 14. We could also find the sum by grouping the lengths together: There are 4 sides with length 1, 2 sides with length 2, and 2 sides with length 3. (4 × 1) + (2 × 2) + (3 × 2) = (4 + 4 + 6) = 14.
3. A. Convert the rug's width of 36 inches to feet by dividing by 12: 36ft ÷ 12 = 3 ft. The area of a rectangle = l × w = 5 ft × 3 ft = 15 ft^2.
4. D. Area of a triangle = $\frac{1}{2}bh$. Each triangle has an area of $\frac{1}{2}$ (8mm×8mm) = $\frac{1}{2}$ (64) = 32 mm^2. There are 4 triangles that make up the rectangle, so we multiply the area of one triangle by 4 to get (4 × 32 mm^2) = 128 mm^2.
5. C. Volume of the pan = $l \times w \times h$ = 10 in × 8 in × 3 in = 240 in^3. Since the batter takes up half of the pan's volume, the volume of the batter = $\frac{1}{2}$ (240 in^3) = 120 in^3.

6. A. First, find the area of triangle *GHI*. Area of a triangle = $\frac{1}{2}$ base × height. The base of triangle *GHI* is 5 cm and the height is 8 cm. The area of triangle *JHI* = $\frac{1}{2}$ (8cm × 5cm) = $\frac{1}{2}$ ×40cm^2 = 20 cm^2. Since triangle *GHI* is an isosceles triangle and two of its sides are congruent, altitude *JH* cuts the triangle into two equal halves. The shaded region *JHI* has half the area of triangle *GHI*. $\frac{1}{2}$ (20 cm^2) = 10 cm^2.

7. B. If *VW* = *WX* = 5 units, the length of the rectangle's base = 5 + 5 = 10 units. Segment *UW* is the width of the rectangle so width = 3 units. The area of the rectangle = l × w = 10 × 3 = 30 square units. The triangle has a base of length 3 + 3 = 6 units and a height of 5 units. Area of a triangle = $\frac{1}{2}$ *bh*. Triangle *SWT*'s area is = $\frac{1}{2}$ (6 × 5) = 15 square units. The sum of the areas of the rectangle and triangle is 30 sq. units + 15 sq. units = 45 sq. units.

8. C. Volume = length × width × height = 4ft × $\frac{3}{2}$ ft × 3ft = 18ft^3.

9. D. Surface area = 2*lw* + 2*lh* + 2*wh*. Using length = 4 ft, width = $\frac{3}{2}$ ft, and height = 3 ft, surface area = 2(4 × $\frac{3}{2}$) + 2(4 × 3) + 2($\frac{3}{2}$ × 3) = 2(6) + 2(12) + 2(4$\frac{1}{2}$) = 12 + 24 + 9 = 45ft^2.

10. C. If *UVWX* is a square, *VU* = *VW* = *WX* = *UX* = 4 cm. If *XY* = $\frac{3}{4}$ *UX*, then *XY* = $\frac{3}{4}$ (4 cm) = 3 cm. Since *WX* = 4 cm, *WY*= 5 cm, and *XY*= 3 cm, the perimeter of the triangle is 3 cm + 4 cm + 5 cm = 12 cm.

11. D. The area of Vinnie's floor = length × width = 8 ft × 9 ft = 72 ft^2. Note that the side of each square tile is 6 *inches*, not 6 feet. Convert inches to feet by dividing by 12: 6 ÷ 12 = 0.5 ft. The area of each tile is 0.5 ft × 0.5 ft = 0.25 ft^2. Divide 72 ft^2 by 0.25 ft^2 to find the number of tiles needed: 72 in^2 ÷ 0.25 in^2 = 72 ÷ $\frac{1}{4}$ = 72 × 4 = 288 tiles.

12. E. Only the area of the playground is given. It is not possible to determine its length and width based on its area and the dimensions of two of its features. The playground has a perimeter of 80 m only if it measures 20 m × 20 m; that is not necessarily true.

13. D. Think of the various factors of 72. The whole number pairs of factors are (8 × 9), (6 × 12), (4 × 18), (3 × 24), (2 × 36), and (1 × 72). Use these factors as the length and width and compute the possible perimeters: An 8 × 9 rectangle has a perimeter of 2(8) + 2(9) = 34. A 6 × 12 rectangle has a perimeter of 2(6) + 2(12) = 36. A 2 × 36 rectangle has a perimeter of 2(2) + 2(36) = 76. A 1 × 76 rectangle has a perimeter of 2(1) + 2(72) = 146. 144 is the only perimeter that is not possible if the length and width are whole numbers.

14. B. This "staircase" shape is simply a rectangle with parts of the right side turned inward. Since all angles are right angles, all the horizontal components cover the same length as the figure's bottom edge and have a combined length of 8. Also, all the vertical components have a combined length equal to the figure's height of 7 units. The perimeter is simply 2(7) + 2(8) = 30.

15. D. The volume of the cube is 4 in. × 4 in. × 4 in. = 64 in^3. If each piece is equally sized, then each piece is $\frac{1}{4}$ the volume of the original cube. 64 in^3 ÷ 4 = 16 in^3.

16. B. If *N* is the midpoint of *MO*, then it splits the segment into two equal halves, and *MN* = *NO* = 5. If *NPQO* is a square, then all four of its sides are congruent, so *NO* = *QO* = *PN* = *PQ* = 5. Since the figure is a rectangular solid, all angles formed by intersecting line segments are = right angles, and *PQR* is a right triangle. Area of a triangle = $\frac{1}{2}$ (*bh*). Triangle *PQR* has base *PQ* = 5 and height *QR* = 6 so area = $\frac{1}{2(5 \times 6)}$ = $\frac{1}{2(30)}$ = 15.

17. B. The volume of the pool is 15 × 25 × 4 = 1,500. One-third of that is 1,500 ÷ 3 = 500.

Angles

1. C. Supplementary angles have a sum of 180°. Therefore, the measure of angle *H* is equal to 180° – 54° = 126°.

2. D. Since the sum of angles *J* and *K* is 145, and *J* = 64°, then 64 + *K* = 145. Solve for *K* by subtracting 64 from both sides of the equation to obtain *K* = 81°.

3. C. The sum of the internal angles of a triangle is 180°. So, $2x + x + 33 = 180$, or $3x + 33 = 180$. Solve for x by first subtracting 33 from both sides to obtain $3x = 147$ and then dividing both sides by 3 to obtain x = 49.

4. A. The two angles with given measurements are vertical angles, meaning they are congruent. Therefore $3x = 60$. Solve for x by dividing both sides of the equation by 3 to obtain $x = 20$.

5. D. The sum of the internal angles of a triangle is 180°. So, $3x + x + 72 = 180$, or $4x + 72 = 180$. Solve for x by first subtracting 72 from both sides of the equation to obtain $4x = 108$ and then dividing both sides of the equation by 4 to obtain and $x = 27$. The question asks for Angle B, which is $3x$, or 81.

6. E. Since the sum of the interior angles of a triangle is 180°, the measure of angle BCA is equal to 180 – (50 + 50) = 80°. Since angles BCA and ACD are supplementary, angle ACD is equal to 180 – 80 = 100°. Since angles CAD and CDA are congruent, they each have the same measure which can be represented as x. The sum of the angles in triangle ACD is $x + x + 100 = 180$ or $2x + 100 = 180$. Solve for x by first subtracting 100 from both sides of the equation to obtain $2x = 80$ and then dividing both sides of the equation by 2 to obtain $x = 40$. Therefore, the measure of angle CDA is equal to 40°.

7. B. The sum of the interior angles of a quadrilateral (4–sided figure) is 360°. A rhombus has 2 sets of congruent angles. Therefore, angle ABC and ADC are congruent and can each be represented by x. The sum of the angles in the rhombus is $(2)(124) + 2x = 360$, or $2x + 248 = 360$. Solve for x by first subtracting 248 from both sides of the equation to obtain $2x = 112$ and then dividing both sides of the equation by 2 to obtain $x = 56$.

8. D. The sum of angle BAC and angle CAD is equal to the measure of angle BAD. If x represents the measure of angle BAC, then $x + 98 = 130$. Solve for x by subtracting 98 from both sides of the equation to obtain $x = 32$.

9. A. Angles BCA and ACD are supplementary, which means their sum is 180°. Therefore, the measure of angle ACD is equal to 180° – 30° = 150°. Angles CAD and CDA are congruent and can each be represented by x. Since the sum of the interior angles of a triangle is 180°, $150 + x + x = 180$ or $150 + 2x = 180$. Solve for x by first subtracting 150 from both sides of the equation to obtain $2x = 30$ and then dividing both sides of the equation by 2 to obtain $x = 15$.

10. D. Since a rhombus is a parallelogram, two adjacent angles are supplementary and add to 180°. If x is the measure of angle ADC, then $46 + x = 180$. Solve for x by subtracting 46 from both sides of the equation to obtain $x = 134$°.

11. C. Since line c is a transversal, the angle with measure 40° and the angle with measure 7x° are supplementary and therefore add to 180°. So, $7x + 40 = 180$. Solve for x by first subtracting 40 from both sides of the equation to obtain $7x = 140$ and then dividing both sides of the equation to obtain $x = 20$.

12. E. Focusing on transversal d and ignoring line c, we see that the angle with measure x° and the angle with measure 40° are supplementary and therefore add to 180°. So, $x + 40 = 180$. Solve for x by subtracting 40 from both sides of the equation to obtain $x = 140$.

13. E. The sum of the angles with measure 50°, measure 100° and the unknown angle between them is equal to 180°. So, $50 + 100 + y = 180$, where y is the unknown angle measure. Therefore $y = 30$°. Focusing on transversal d, we see that the angle with measure x° and the angle with measure 30° are supplementary and therefore add to 180°. So, $x + 30 = 180$. Solve for x by subtracting 30 from both sides of the equation to obtain $x = 150$.

Unit Analysis

1. C. Multiply each value by 1,000 to find the mass in grams: $2.1 \times 1,000 = 2,100$ grams. $3.2 \times 1,000 = 3,200$ grams. Therefore, the difference is $3,200 – 2,100 = 1,100$ grams.

2. C. It may help to convert one time to minutes or seconds. One half minute is equal to 30 seconds, so Tom's time was 7 minutes and 30 seconds. Adding 45 is equal to 7 minutes and 75 seconds. Since there are 60 seconds in 1 minute, we can regroup to show 8 minutes and 15 seconds.

3. C. The total amount of juice is $4 \times 350 = 1,400$ milliliters of juice. This is equal to $1,400 \div 1,000 = 1.4$ liters of juice.

4. C. If there are 8 pints in a gallon, then multiply the number of gallons by 8 to find the number of quarts. $2.5 \times 8 = 20$.

5. A. To find the number of pounds, divide by the number of grams in a pound. $1,384 \div 346 = 4$, so 1,384 grams is equivalent to 4 pounds.

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6. B. If each pencil is 40 grams, and there are 8 pencils, then the total mass of the pencils is 320 grams (40 × 8 = 320). The total mass of the pencils and the holder is 600 grams (0.6 kilograms × 1,000 = 600). 600 – 320 = 280, so the mass of the pencil holder is 280 grams.
7. E. Convert the feet to inches. John jumped 22 feet, 6 inches. That is equal to 22 × 12 + 6 = 270 inches. Maya jumped 20 feet, 4 inches, or 20 × 12 + 4 = 244 inches. 270 – 244 = 26 inches.
8. B. If there are 2 cups in a pound, and Julio has 4 pounds of sugar, then he has 2 × 4 = 8 cups of sugar. If he needs 2 out of 8 of those cups, he can express that as the fraction $\frac{2}{8}$, which can be simplified to $\frac{1}{4}$.
9. B. To convert centimeters to inches divide by the number of centimeters in an inch. 76.2 ÷ 2.54 = 30. So, 76.2 is equal to 30 inches.
10. A. 72 inches is equal to 72 × 2.54 = 182.88 centimeters. Divide by 100 to find the number of meters: 1.8288 meters.

Data Analysis

Interpreting Bar Graphs

1. D. There are 20 spinach plants and 26 tomato plants. 20 + 26 = 46.
2. B. There were 6 people who voted for football and 5 who voted for hockey. 6 + 5 = 11, which is the same number of people who voted for baseball.
3. B. The bar for the number of notebooks ends about halfway between 450 and 500, so we can estimate that 475 notebooks were sold. 250 folders were sold. 475 – 250 = 225.
4. C. 35 girls chose swimming. 20 boys chose canoeing. 35 – 20 = 15.
5. A. There are 40 people who have dogs. There are 20 people who have fish and 10 who have other pets, so 30 combined. 40 – 30 = 10.
6. D. There are 41 students who speak Spanish and 15 who speak Arabic. 41 – 15 = 26.
7. A. There are 17 students who speak French and 15 who speak Arabic 15 + 17 = 32. There are 46 students who speak English. 46 – 32 = 14.
8. C. April 2 had a temperature difference of 60 – 38 = 22 degrees. April 3 and April 4 both had temperature differences of 20 and 24 degrees, respectively, and April 6 had a temperature difference of 26 degrees. April 5 had a difference of 22 degrees, the same as April 2.
9. E. As found in the previous problem, April 6 has a difference of 26 degrees, which is the greatest difference.
10. C. Based on the graph, the number of phones sold is about 450 and the number of laptop computers sold is about 250. 450 – 250 = 200, so this is the best estimate.
11. D. There were about 250 laptop computers and 150 desktop computers sold, according to the graph. 250 + 150 = 400, so this is the best estimate.

Interpreting Histograms

1. B. Be aware that temperature lies on the horizontal axis and higher temperatures are farther to the right. Between 0–200 meters, the average temperature is 15℃. Between 801–1000 meters, the average temperature is a little less than 9, so we can estimate 8.75℃. (15 – 8.75) = 6.25.
2. C. Since the team recorded temperatures at different altitudes, we are concerned with how the temperature changes as altitude increases so we can cross off B and D. As altitude increases, the bars get shorter, indicating a decrease in temperature.
3. A. Heights of columns indicate number of insects in each category. For example, 5 insects were 0 – .5 cm long. Be sure to count the total number of insects correctly. Shira collected a total of (5 + 8 + 12 + 15 + 10 + 14) = 64 insects. 8 of those insects were 0.6–1 cm long. $\frac{8}{64}$ can be reduced to $\frac{1}{8}$.
4. E. This graph only tells us how many insects fell into various ranges of length. We know that 15 of Shira's insects were between 1.6 and 2 cm long, but we do not know any exact length within that range. All, some, or none of the insects could be exactly 1.6 cm long.
5. E. Include the stores in the $121-$150 million (45), $151-$180 million (40), and $181-$210 million (50) ranges. The numbers total (45 + 40 + 50) = 135. Do not include stores in the other categories.

6. B. "No more than half" of $120 million means half of $120 million ($60 million) or less than $60 million. Only count the stores that sold $0-$30 million (5) and $31-$60 million (15). (5 + 15) = 20.

7. C. 50 units rent for $0 – $500 and 150 units rent for $501–1,000. A total of (50 + 150) = 200 units rent for $0-$1,000. 350 units rent for $1,501-$2,000 and 250 units rent for $2,001-$2,500. A total of (350 + 250) = 600 units rent for $1,501-$2,500. A ratio compares one number with another in lowest terms using the *x:y* notation. 200:600 can be reduced to 1:3.

8. B. Before the above-mentioned units are taken off the market, the most frequent rent range is $1501-$2,000 (350), followed by both $1,001-$1,500 and $2,501-$3,000 (both $300). Removing 75 of the $1,750 units reduces the number in the $1,501-$2,000 range to 350 – 75 = 275. Removing 90 units priced at $2,960 reduces the number of units in the $2,501-$3,000 range from 300 to 210. The $1,501-$2,000 range still has 300 units, making it the most common rent category.

9. C. This number should not include the students who checked their phones 4-5 times. It should include only those who did so greater than, but not including, 5 times. This is 6 + 7 + 3 + 5 + 2 + 1 = 24.

10. D. The height of each column indicates the number of students in each category. For example, 3 students didn't check their phones at all. From left to right, 3 + 4 + 4 + 6 + 7 + 3 + 5 + 2 + 1 = 35 total students.

Interpreting Line Graphs

1. C. In 2018, the population of Bartonville was 300,000. In 2012, the population was 100,000. 300,000 – 100,000 = 200,000. Make sure to subtract and not add the populations, and to track population figures for the correct years.

2. D. From Monday to Thursday, Lee's sold 85 – 35 = 50 fans. After restocking, it sold an additional 100 – 95 = 5 fans from Friday to Saturday. The total number of fans sold was 50 + 5 = 55 fans.

3. A. At 12:00PM, Harriet was 50 miles from home. By 5:00PM, she was 250 miles from home. The total distance she traveled was 250 – 50 = 200 miles over the 5 hours. Average speed is (total distance ÷ total time) = 200 miles ÷ 5 hours = 40 miles per hour.

4. D. Anna read 7 books in the first month; 5 books in the second month; 0 books in the third month; 4 books in the fourth month; 10 books in in the fifth month; 4 books in the sixth month; 1 book in the seventh month; and 6 books in the eighth month. 7 + 5 + 0 + 4 + 10 + 4 + 1 + 6 = 37 books.

5. B. Anna read more than 4 books over the following months: 7 books during the first month; 5 books during the second; 10 books during the fifth month; and 6 books during the eight month, which is 4 months total. Note that during the fourth and sixth months, Anna read exactly 4 books, which is the same number of books that Jenny read, but not more than Jenny.

6. C. In July, Leon's balance was $450. In August, his balanced dropped to $300. $450–$300 = $150. In contrast, the balance only dropped by $100 between February and March, stayed the same between May and June, increased by $50 between August and September, and decreased by only $25 between September and October.

7. D. On December 1, Leon has $350 in his account. After he withdraws $50, he has $350–$50 = $300. After he deposits $125, he has $300 + $125 = $425. Since no other deposits or withdrawals were made, this will be the balance on January 1, 2019.

8. E. The Khans budgeted $9,000 + $8,000 + $10,000 + $9,000 = $36,000 in 2016. Their 2016 savings = (earnings – expenses) = $80,000 – $36,000 = $44,000.

9. C. Answer A cannot be correct since yearly growth drops off at rainfall greater than 60 inches. At that point, the plant's growth decreases by very little (1 cm). This can be described as a slight, not a rapid, drop–off. Answer D is incorrect since the plant grows more at 30 inches of rain than at 20 inches, and more at 40 inches than at 30 inches. E is incorrect because the line is steeper between 30 and 40 inches than between 40 and 50 inches.

10. D. Plant *X* needs 30 inches of rain to grow 10 cm and 40 inches of rain to grow 15 cm. The amount of rain needed for Plant *X* to grow 12 cm must be between 30 and 40 inches.

Interpreting Circle Graphs

1. C. According to the circle graph, 40% of students chose Math. To find 40% of the 350 students total, convert 40% into the decimal 0.40 and multiply by 450: 0.4 × 350 = 140.

2. E. One quarter is $\frac{1}{4}$ = 0.25 = 25%. The sum of History (15%) and English (10%) = 15% + 10% = 25%.

3. B. You could calculate the different percentages of $40 until arriving at the right answer of 0.08 × $40 = $3.20. A quicker way to solve this problem is to recognize that $4 is 10% of $40 and since $3.20 is less

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than $4, our answer must be the category on which Olive spends less than 10%. Pet Supplies (8%) is the only such category.

4. C. In one month, Olive saves 15% of $40 which is 0.15 × $40 = $6. Multiplying $6 by 12 months yields how much she saves in a year: $6 × 12 = $72.

5. E. The 12 people who chose mangoes represent 15% of the total. So, 12 = 15% × total or 12 = 0.15 × total. To find the total, divide both sides by 0.15: total = 12 ÷ 0.15.

6. D. We can solve this by setting up a proportion with the numerators representing oranges and the denominators representing bananas. $\frac{oranges}{bananas} : \frac{8\%}{30\%} = \frac{16}{x}$ which reduces to $\frac{4}{15} = \frac{16}{x}$. Cross multiply to get $4x = 16 \times 15$. Divide both sides of the equation by 4 to obtain $x = 4 \times 15 = 60$.

7. C. We can solve this by setting up a proportion with the numerators representing "other" toppings and the denominators representing totals. $\frac{other}{total} : \frac{20}{200} = \frac{x}{360}$ which reduces to $\frac{1}{10} = \frac{x}{36}$. Cross multiply to get $10x = 360$. Divide both sides of the equation by 10 to obtain $x = 36$.

8. D. We can solve this by setting up a proportion with the numerators representing numbers relating to toppings and the denominators representing totals. $\frac{topping}{total} : \frac{90}{360} = \frac{x}{200}$ which reduces to $\frac{1}{4} = \frac{x}{200}$. Cross multiply to get $4x = 200$. Divide both sides of the equation by 4 to obtain $x = 50$. Plain cheese was ordered 50 times.

9. B. The Set & Props slice is less than half (50%) but more than a quarter (25%). 50% of $2000 is 0.5 × $2,000 = $1000 and 25% of $2,000 is 0.25 × $2,000 = $500. $750 is the only answer between $500 and $1,000.

10. D. The Costumes slice is about the same size as the Play Rights slice. If they spent $400 on Play Rights, then they could only have spent $450 on Costumes, since that is the only answer option that is close in value.

Statistics & Probability

Basic Probability

1. A. Using the formula: $P(Event) = \frac{Number\ of\ ways\ Event\ can\ occur}{Total\ number\ of\ outcomes}$, P(Triangle) $= \frac{2}{10} = \frac{1}{5}$.

2. D. There are 3 + 2 + 1 = 6 pizzas total. Using the formula: $P(Event) = \frac{Number\ of\ ways\ Event\ can\ occur}{Total\ number\ of\ outcomes}$, P(Cheese) $= \frac{3}{6} = \frac{1}{2}$.

3. C. Multiply the probabilities by 27 to find the number of marbles. $\frac{1}{3} \times 27 = 9$ and $\frac{2}{3} \times 27 = 18$. The greatest number in between 9 and 18 is 17.

4. A. There are (3 + 2 + 4 + 5) = 14 other fish in the aquarium, so there are 21 – 14 = 7 goldfish in the aquarium. Using the formula: $P(Event) = \frac{Number\ of\ ways\ Event\ can\ occur}{Total\ number\ of\ outcomes}$, P(Goldfish) $= \frac{7}{21} = \frac{1}{3}$.

5. C. On the spinner, the numbers greater than 2 are: 3, 4, and 5. There are 4 slices with these numbers. Using the formula: $P(Event) = \frac{Number\ of\ ways\ Event\ can\ occur}{Total\ number\ of\ outcomes}$, P(Greater than 2) $= \frac{4}{12} = \frac{1}{3}$.

6. B. P(Grand Prize or Small Prize) = P(Region 1 or Region 2) = P(Region 1) + P(Region 2) = $\frac{1}{10} + \frac{1}{5} = \frac{1}{10} + \frac{2}{10} = \frac{3}{10}$.

7. C. Using the formula: $P(Event) = \frac{Number\ of\ ways\ Event\ can\ occur}{Total\ number\ of\ outcomes}$, P(Square) $= \frac{4}{14} = \frac{2}{7}$.

8. D. There are 4 circles and 2 triangles. So, there are 4÷2 = 2 times as many circles as triangles. Therefore, P(Circle) will be 2 times greater than P(Triangle).

9. A. There are 23 + 7 + 4 + 6 = 40 coins total. Using the formula: $P(Event) = \frac{Number\ of\ ways\ Event\ can\ occur}{Total\ number\ of\ outcomes}$, P(Dime) $= \frac{4}{40} = \frac{1}{10}$.

10. D. There are 13 + 8 + 7 + 7 = 35 cars total. Of the 35 cars, 7 + 7 = 14 are not from California or New York. Using the formula: $P(Event) = \frac{Number\ of\ ways\ Event\ can\ occur}{Total\ number\ of\ outcomes}$, P(Not CA or NY) $= \frac{14}{35} = \frac{2}{5}$.

11. B. Multiply each probability by 60 to determine the number of employees. P(Drive) × 60 = $\frac{2}{5}$ × 60 = 24; P(Public Transportation) × 60 = $\frac{1}{3}$ × 60 = 20; P(Walk) × 60 = $\frac{1}{6}$ × 60 = 10; and P(Bike) × 60 = $\frac{1}{10}$ × 60 = 6.

12. C. Since only a white square is worth exactly 3 points, the question is asking for the probability of landing on a white square. Using the formula: $P(\text{Event}) = \frac{\text{Number of ways Event can occur}}{\text{Total number of outcomes}}$, P(White Square) = $\frac{8}{25}$.

13. E. There is a total of 9 + 4 + 6 + 1 + 10 = 30 candies. One-fifth of that is 30 ÷ 5 = 6, which is the number of strawberry candies.

Compound Events

1. C. P(tails) = $\frac{1}{2}$. Since the coin is fair, past outcomes have no impact on future outcomes.

2. A. The only letter MATH and ENGLISH have in common is the letter H. P(H and H) = P(H in MATH) × P(H in ENGLISH) = $\frac{1}{4}$ × $\frac{1}{7}$ = $\frac{1}{28}$.

3. E. P(one, one, and one) = P(one) × P(one) × P(one) = $\frac{1}{6}$ × $\frac{1}{6}$ × $\frac{1}{6}$ = $\frac{1}{216}$.

4. A. If each digit can be 0–9, then for each digit on the license plate, there are 10 possible numbers. The chance of getting an 8 from 0–9 is 1 out of 10, or $\frac{1}{10}$. Since we want to get 8 three times in a row, we need to multiply: P(8, 8, and 8) = P(8) × P(8) × P(8) = $\frac{1}{10}$ × $\frac{1}{10}$ × $\frac{1}{10}$ = $\frac{1}{1,000}$.

5. A. Since there is an equal number of blue, green, and yellow stickers, the probability of choosing any color is $\frac{1}{3}$. P(Yellow and Blue) = P(Yellow) × P(Blue) = $\frac{1}{3}$ × $\frac{1}{3}$ = $\frac{1}{9}$. The probability did not change because the first sticker was replaced.

6. C. If you're not sure whether to multiply or add, list combinations. If the first letter in the pair represents the stickers, and the second letter represents the pencils, we could have: RR, RG, RB, GR, GG, GB, BR, BG, BB. In only 3 of the 9 combinations are the colors the same ($\frac{1}{3}$).

7. B. P(Green and Red) = P(Green) × P(Red) = $\frac{2}{10}$ × $\frac{6}{9}$ = $\frac{12}{90}$ = $\frac{2}{15}$. The total number of marbles decreased from 10 to 9 because the first marble was not replaced.

8. E. There are three cards with numbers that are divisible by five: 5, 10, and 15. P(two cards divisible by five) = P(divisible by five) × P(divisible by five) = $\frac{3}{15}$ × $\frac{2}{14}$ = $\frac{6}{210}$ = $\frac{1}{35}$. Since there was no replacement, the number of cards that are divisible by five decreased from 3 to 2 and the total number of cards decreased from 15 to 14.

9. D. P(Green and Purple) = P(Green) × P(Purple) = $\frac{2}{10}$ × $\frac{1}{9}$ = $\frac{2}{90}$ = $\frac{1}{45}$. The total number of chocolates decreased from 10 to 9 because the first chocolate was not replaced.

10. B. P(Yellow and Green) = P(Yellow) × P(Green) = $\frac{10}{20}$ × $\frac{3}{19}$ = $\frac{30}{380}$ = $\frac{3}{38}$. The total number of marbles decreased from 20 to 19 because the first marble was not replaced.

11. D. P(Red, Red, and Red) = P(Red) × P(Red) × P(Red) = $\frac{5}{15}$ × $\frac{4}{14}$ × $\frac{3}{13}$ = $\frac{60}{2730}$ = $\frac{2}{91}$. Since there was no replacement, the number of red cards decreased from 5 to 4 to 3 and the total number of cards decreased from 15 to 14 to 13.

Mean, Median, Mode

1. E. The mode is the most frequently occurring value. For *A*, the mode is 8. For *B*, the mode is 7. For *C*, the mode is 9, For *D*, the mode is 10. And for *E*, the mode is 6. Therefore, *E* has the mode with the smallest value.

2. C. The mean is the sum of the values divided by the number of values in the set. So the mean is equal to $\frac{80+70+100+90+80+90}{6} = \frac{510}{6}$ = 85.

3. B. To solve, order the values: 18, 28, 34, 36, 44. The median is the value in the middle, or 34, and the sports card that matches this is basketball.

4. D. The range of data is equal to the difference between the greatest and least values in a data set. According to the bar graph, the greatest value is 34 (sports) and the least is 12 (newspaper). 34 – 12 = 22.

5. C. The values ordered are 30, 36, 40, 60, 60, 75. Since there are an even number of values, to find the "middle" find the value halfway between the two middle values, or the mean. 40 + 60 = 100; 100 ÷ 2 = 50. Or, 50 is halfway between 40 and 60. So the median is 50.
6. E. The median is the middle value. These values ordered must be 44, 48, 52, 56, ? or 44, 48, 52, ?, 56. The only value that can be true is greater than 52, so 64 is the only possible answer.
7. A. The median is the middle value. These values in order are 130, 152, 256, 282, and 314, so 256 is the median. Book 1 has 256 pages.
8. A. The range is the difference of the greatest and least values in a data set. 220,000 – 112,000 = 108,000.
9. B. The mean is equal to the sum of the values divided by the number of values. So, if b is the weight of the missing box, $\frac{18+12+b}{3}$ = 20. Solving for b yields b = 30. (You can check by adding: 18 + 12 + 20 = 60; 60 ÷ 3 = 20.)
10. D. An average of 4 runs per game is equal to a total of 40 runs over 10 games. The sum of runs scored in the first 9 games is equal to 5 + 4 + 4 + 1 + 5 + 6 + 3 + 4 + 2 = 34. The difference of 40 – 34 = 6, so the team would need to score 6 runs in the 10th game to have an average of 4 runs per game.
11. B. If the mean time is 1.2 seconds, then the sum of the total time for all laps is 1.2 × 6 = 7.2. The sum of the given times is 0.9 + 1.0 + 1.4 + 1.6 + 1.2 = 6.1. The difference between 7.2 and 6.1 is 7.2 – 6.1 = 1.1, so the remaining time must be 1.1.
12. D. The average of Angela's first 5 games is 13. She wants an average of 13+2=15 after her 6th game, so she needs a total of 15×6=90 points. She needs to score 90-65=25 points in her 6th game.
13. B. The mode is 88, and the median is 85, so their difference is 88 – 85 = 3.

Verbal – Synonyms

Introductory

1. D. To "abandon" means to "leave", which is the opposite of "defend." To "run" is an example of a way to abandon something but not the definition. One could abandon or leave something by walking away, for example.
2. E. To be "rebellious" means to not follow the rules, or to be "disobedient." The suffix "–ious" means "to have the quality of" or be full of, and the root word "rebel" means to "act up", which makes the definition the "quality of acting up", or "not following the rules." We "punish" someone when he or she is "rebellious," and someone who is "tame" is calm or not dangerous, which is the opposite of "rebellious."
3. E. To "recover" means to get better, or "heal." We are looking for a verb, which eliminates "enthusiastic," an adjective, and "blanket" and "wellness," which are nouns. To "cherish" means to love and care for something or someone.
4. A. "Rehabilitation" is when someone gets better from being sick or an injury. "Habilitate," which means to "make fit or able," is the root word. The prefix "re–" means "again," while the suffix "–ation," which means the process of, changes "habilitate," which is a verb, into a noun. When we put these together, the definition is the process of making someone fit or able again. The best answer is "recovery," which means "to get better".
5. D. To "research" means to examine something or "study." An "assistant," or someone who helps another person, can help with research. Sometimes research can appear or be compiled into a "textbook."
6. B. A "revolution," or a revolt, is when a group of people use force to get rid of the people in power. There root word "volv" means to turn, while the prefix "re–" means back and the suffix "–tion" means "the state or quality" of something. The definition is then "the state of turning back something or getting rid of something." The best answer is "revolt," which shares the same prefix and similar root word that has the same meaning as "volv." Notice that a "wheel" revolves, but does not hold a "revolution" (though it can complete a revolution).
7. D. When you "edit" something, we "change" it. We are looking for a verb, so "paper" and "journal" can be ruled out. To "delete" something means to remove or erase (which could be a type of edit) and to "type" is to write something on a "computer" keyboard by pressing keys.
8. D. A "site" is a place, or "location." Even if you did not know the answer, we can use the process of elimination to get the answer. "Quote," "detest," and "stand" are all verbs. To "quote" something means to repeat another person's words (often used interchangeably with "cite"). To "detest" means to hate and

"stand" means "to be upright or on your feet." "Concise" is an adjective that means "giving all important information without a long explanation."

9. E. "Somewhat" means "a little bit," or "slightly." We are looking for an adverb, which means we can eliminate "amendment," a noun, and "free" and "casual," which are adjectives. "Kindly" means in a nice manner, which is not the right definition.

10. B. "Stress" happens when you have a lot to do and feel "pressure." An "environment," or your surroundings, can cause "stress," while you can take a "test" to see how much "stress" you are under.

11. B. A "style" is "fashion," or a type of way of dressing or looking. We can eliminate "apologize," a verb, and "bountiful," an adjective, because we are looking for a noun. While "art" can have a style, it is not analogous. "Conquest" is something that has been taken over, usually by force.

12. E. A "submission" is an "entry," or something that is given to a group or person, usually for a contest. "Submission" has the root word "submit," which means "to enter". The root word of "entry," is the same, which means enter or into. A "participant" is a person who takes part in something, can enter a "submission" to win a "prize," or reward.

13. A. A "team" is a group of people who work or play together toward a common goal. Although we can "cheer" a team on, or "audition," or try out for a team, these are not analogous, because they simply relate to what teams do. A "team" can play in a "game," or an entertaining activity played between people.

14. E. When something is "unattractive," it is not nice to look at, or "ugly." The prefix "un–" means "not" and the root word, "attractive," means "nice to look at". While we can have "disgust" when we see something "unattractive," the word "disgust" is a noun and we are looking for an adjective. Something that is "astonishing" is surprising (but not necessarily unattractive), while "completely" is an adjective that means totally or entirely. Something that is "forced" is not natural and requires effort.

15. A. Something that is "unfinished" is not done yet, or "incomplete." The prefix "un–" means "not," while the root word "finish" means to end something. The prefix of incomplete, "in–" also means "not" and the root word "complete," also means to end something.

16. C. When something is "unworthy," it is "not deserving." The prefix "un–" means "not", while the root word "worth" means value. The suffix "–y" means made up of, which makes the definition something that is "made up of not a lot of value."

17. B. "Widespread" means covering everything, or "all over." If we break down the word, we see "wide" and "spread." Something that is "wide" means it is bigger than average size. "Spread" means to cover a lot of area. The only option that talks about size and coverage is B.

18. C. An "index" is a "list," or something that groups individual items or names in a specific order one after another, usually in alphabetical order. "Series" does not work because the things in a series must have something in common or be related, whereas a "list" or "index" is general. One finger is usually named the "index" finger, but do not let this confuse you.

19. D. An "instance" is a single event or moment, or an "occasion." The word "instant," which can be found in "instance" means something that happens immediately, while the suffix "–ance" means the "state or quality of." The definition of instance then means "the state of happening immediately." "Section," means "part of something". "External" means "outside", while "status" means "a person's position or standing." A "project" is a task that needs to be done. None of these are correct definitions for "instance."

20. E. A "job" is regularly paid role doing or creating work for someone, or "occupation." We are looking for a noun, which gets rid of "working," which is a noun. "Rules" and "boss" only relate to a "job," but do not give the correct definition. "Prejudice" is an opinion that someone has that is not based on facts.

21. D. When something is "minor," it is small or "unimportant." The root word "min" means small or less. While "minor" can be used to describe a person who is not an "adult," there is no choice that expresses this, so "unimportant" is the best answer.

22. C. "Neutral" means having no favor or opinion toward something, or "unbiased." When someone has a bias, he or she has an unfair favor for one thing over another. The prefix "un–" means the opposite of, which makes "unbiased" the opposite of having an unfair favor for one thing over another.

23. A. "Overall" means "generally," or looking at things as a whole or as a bigger picture. We are looking for an adverb, which eliminates "above" and "within," which are prepositions. "Seldom" means rarely, which is not the correct definition.

24. E. A "partner" is a person who is with you to help you accomplish something, or an "ally." There can be a "partner" at a "company," meaning they take part in the business with others, but that is an example and not a definition. Members of a "gang," or big group, can be considered partners, but this is also an

example and not definition. An "applicant" is someone who applies or makes a request for a job or "position."

25. A. "Disposable" means something is not needed and can be thrown away after being used. "Expendable" is the best answer. To "expend" means to use up or spend, while "dispose" means to throw away." The suffix "–able" means to able to be. In both cases, "expendable" and "disposable" means "to be able to thrown out or used up." We can throw out "garbage," which is an example of something that is disposable. "Income" that is "disposable" is income that is used for whatever someone wants. Both "garbage" and "income" are words that are closely associated with the word, but not the definition.

26. E. A "process" is a "method," or a series of steps that is taken to accomplish something. During a "process," we can "redo," or start over, a step. "Perform" means to entertain an audience; while a creating a performance may be a process, there are many other examples of processes. A "funeral" is a ceremony to bury the dead. A "parade" is a celebratory ceremony often referred to as a "processional."

27. D. To "equip" means to get ready for something, or to "supply" something in preparation of something else. You may think of "equipment" when you see this word, and we can "equip" ourselves with a "tool" or "weapon" to get ready for war, but those are examples and not definitions. When we want to make a joke, we "quip," but that is not the same as "equip." The best answer is "supply."

28. D. To "presume" means to guess, or "suppose." The prefix "pre–" means "before" or "early," and the root word "sume" means "to take". The definition is then "to take an early guess." While "preview" has the same prefix, it means to "see early," not to "guess." To "suppose" means to place a guess.

29. D. A "disgrace" is something that is unacceptable or has lost its honor. The prefix "dis–" means away or opposite of, making the definition: away or opposite of grace. This eliminates "grace." "Embarrassed," an adjective, and "negatively," an adverb, do not fit the criteria since we are looking for a noun. "Erratic" is also an adjective, which leaves "shame" as the answer.

30. A. To "excel" is to achieve (and be very good) at something. Try using the word as you may have heard it: "You can excel at school if you study." This means to actually do more than to compete or try – it means to actually be successful.

31. C. To "identify" something is to "figure it out," or classify it as something or detect it. Something that can be identified is someone's character, or a "clue" in a mystery. This is the opposite of "mask" or "hide".

32. E. An "environment" is everything in an area in which a person or thing lives in, or "surroundings." While "biological" and "natural" are common words associated with "environment," they are both adjectives and we are looking for a noun. "Estate" is a piece of land owned by someone and isn't the best definition. "Current," which means something relevant or happening now, does not make sense, leaving "surroundings" as the only answer. When we break down "environment," the prefix "en–" means around or in and the root word "vi" means life, while the suffix "–ment" means result. The definition of "environment" means a place where life can result from or live in.

33. B. A "catastrophe" is a very negative event – a "disaster" – not merely an "event" or a "happening." It begins with the root word "cata–," which means "down" or "against."

Intermediate

1. D. An "abundance" means to have a lot of something. "Great amount" is the best definition, while "very wealthy" is a specific example of having an abundance of wealth. Use the word in a sentence if you're unsure: "There was a great abundance of people who wanted the rare cheese."

2. A. A "phase" is a certain period of time, or a "stage." We can eliminate "admit," since it is a verb and we are looking for a noun. While we can "stall," or block, a phase, it is not the correct definition. A big task, or a "project," will usually have different "phases" to keep things organized. A "contract" is an agreement between two people.

3. C. "Predominant" means main, or "primary." The root word "dominant" means the most important or powerful. "Powerfully" ends in "–ly," and is therefore an adverb, while we are looking for an adjective.

4. E. A person who is "adventurous" is "outgoing," which means "willing to try new things." While "excursion" can be associated with the noun "adventure," we are looking for an adjective. "Anxious" is the opposite of "adventurous," while "deadly" means something that can cause death.

5. C. To be "desolate" means for a place to be "empty," or without anyone or anything. The prefix "de–" means to reduce or lessen, and the suffix "–ate" means the state of being. Desolate means to be in a state with little of anything. Do not get tricked by seeing the word "tardy," which means "late."

The Tutorverse
MAKING THE UNIVERSE BRIGHTER, ONE STUDENT AT A TIME

6. B. To "promote" means to make more people aware of an idea or thing, or to "advertise." We can get rid of "benevolent," which is an adjective, and "television," which is a noun and on which are promotions, because we are looking for a verb. When we "announce" something, or give a public statement, that is example of how we "promote" something. "Enlarge" means to make bigger.

7. C. A "proposal" is a plan, or "suggestion," that is submitted and will be looked at by others. A common example is a "wedding proposal," where a person proposes marriage to another person, or asks that person to "marry." While "wedding" and "marry" are related to a specific example, they do not reveal the definition of "proposal."

8. D. To "rely" on something means to "depend," or count on. For example, we "rely" on food and water to keep us alive, or we "rely" on "sleep" to keep us healthy. We do not "rely" on a "liar," or someone who does not tell the truth, for important information. We can "befriend," or make friends with, someone so that we can "rely" on them in the future. "Sleep," "liar," and "befriend," are all words that are commonly associated with "rely," but are not the best options.

9. C. A "role" is a purpose, or "function," that someone or something has. For example, an actor's "role" is "acting" in a movie. A "challenge" is something that is a hard task, while being "selfish" means only caring about yourself. A model, or "person who poses for pictures," may win a role, but they do not mean the same thing.

10. C. To be "aware" means to know things about a situation. When you are "aware", you are "conscious," or alert and informed. You can "watch" things while you are "aware" and things are "noticeable," or apparent, when you're "aware," but conscious is the best definition.

11. D. A "statistic" is a fact, or "data," that is part of research or a study. We can eliminate "confidential" and "factual" because we are looking a noun, not adjectives. While a "statistic" is "factual," it is not the best definition. To "state" something means to say, while a "catalog" is a list of things.

12. B. "Communication" is the exchange of information, which is synonymous with "message." The prefix "com" means common, while the suffix "ation" means the process of. Putting this together, communication means "a common process of exchanging information." People can communicate over a "device," like the "telephone" or on a "computer," but the best answer is a "message."

13. D. To "devote" means to give a lot of time or resources to something or someone, or to "dedicate." A common religious example is when a person dedicates, or devotes, his or her time to "prayer" or "church."

14. D. An "area" is a section, or "space," that is used for a specific purpose. "Farmland," a specific piece of land for a farm, and "acre," a measurement of land, are all examples of an "area." A "void" is a completely empty space, which is also an example.

15. E. "Vision" means "sight," or the ability to see. The prefix "vis" means see. While "glasses" can help your vision and an "eyeball" is what gives you vision, these words closely associated with "vision" and "sight," and do not give the correct definition. A "leader" is someone who takes charge of a group of people (who has a vision), while "selfless" is an adjective that means you take care of others first before yourself.

16. E. When we face "adversity," we are facing something that is bad, or a "misfortune." When something is "adverse," it is harmful or does not help you obtain a goal. By adding the suffix "–ity," which means "the state or condition of," to "adverse," which is the root word, it turns the word into a noun. This is why "enemy" and "challenging" are not the right answers. An "enemy" can be an "adversity" and an "adversity" is "challenging," but they do not reveal the best definition. "Diversity" may look like the right answer, but it means variety, while "advertise" is a verb and means to promote. "Misfortune" is the best answer. The prefix "mis–" means bad and the root word "fortune" means luck or condition, which makes the definition: bad condition, which is best definition for "adversity.

17. D. Design can be used as a noun (describing a pattern) or a verb (to plan). Clothing is that which is designed or that displays a design. One might learn how to design at a "school." An "artist" typically creates a design. The best choice is to choose the verb "plan."

18. B. To "analyze" means to look at carefully, or "examine." We can get rid of "artificial," which is an adjective, and "calculation," which is a noun, since we are looking for a verb. To "agitate" means to make uneasy or upset. Notice that "evaluation" is a noun, but "analyze" is a verb.

19. E. To "minimize" something means to make smaller, or "lessen." The prefix "mini" means small or less and the suffix "–ize" means become or cause, making the definition: to become small or lessen.

20. A. A "globe" is the earth or "world." "Round," "historical" and "international" can be eliminated since they are adjectives and we are looking for a noun. The theater is a place to watch entertainment (a famous theater is the Globe Theater), which is not the definition of "globe."
21. B. A "grade" is a set of different values given based on performance, or "rank." For example, a "teacher" gives a "student" a "test" to see whether he or she really learned the material. If the student does not do well, he or she will get a bad grade. If the student does well, he or she will get a good grade. The grade is usually given in "letter" format, with 'A' being the best grade, and 'F' being the worst. Still, there can be other formats for grades, so "rank" better captures the meanings.
22. B. When something is "legal," it is permitted, or "allowed." We can eliminate "lawyer" and "court" since they simply relate to the law. "Careful" means to be "full of care" or "cautious" and "stable" means firmly in place or steady, leaving "allowed" as the only answer.
23. B. An "aspect" is a specific part of something, or "trait." For example, a personality "trait" of a good person is honesty. A good person can have more than one trait. They can be responsible or funny. All of these traits or "aspects" make up a personality.
24. D. "Hence" means for this reason, or "therefore." It is used to explain something. For example: "the teacher was sick, hence the students had a substitute teacher."
25. D. When something is "impractical," it means it is not possible, or "unrealistic." The prefix "im–" means "without" or "not." In this case, "impractical," means "not practical," or "not possible." The prefix "un–" also means "not," which means "unrealistic" means "not realistic," or "not practical."
26. D. Something that is "indefinite" has an unknown length of time, or "unspecific" amount of time. In this instance, the prefix "in–" means "not" and "definite" means clearly stated, or specific, which makes the definition not clearly stated. "Invisible" has the same prefix, but "visible" means something that can be seen and is not the correct definition we are looking for.
27. A. To "eliminate" means to get rid of, or "remove." The suffix "–ate" means the state of being, which means eliminate means the st1ate of being removed. For example, a team that loses a game is eliminated, or removed, from a tournament.
28. A. "Internal" means to be inside something, or "inner." The root word "inter" means between and the suffix "–al" means relating to, which makes the definition "relating to being between something." We can get rid of "hide" and "consist" since they are verbs and we are looking for an adjective. "Secret" is a noun and can also be eliminated. "Brief" means to not take a long time and "consist" means to be made up of.
29. A. When we "investigate" something we look into it, or "examine." A "detective," or a person who solves crimes, can use a "clue," or something that helps solve a mystery, to "investigate" something. We are looking for a verb, so we can eliminate "specific," and "invest" means to put time or money into something.
30. C. Something "approximate" is estimated, or roughly guessed. This rules out "certain" and "precise, which are antonyms. It has nothing to do with whether something is "demanding" or "set" as something.
31. A. Something that is "rigid" is "stiff" or unyielding. It has nothing to do with the effectiveness, height, or responsibility of something. Something that is rigid need not be simple or complex.
32. B. To "belittle" someone means to "criticize," or make someone feel unimportant by pointing out his or her mistakes. While you can make a person feel "small," we are looking for a verb, not a noun. The prefix "be" means "to make or cause to be." In this case, it means to make someone feel little. Notice, it doesn't mean to make someone little, or "shrink," which is why "criticize" is the best answer.
33. A. "Endure" is related to "endurance," and means "to last" or "to continue" (if you have a high endurance, you can last or continue for a long time). You can "train" or "workout" to develop this, but notice that "endure" is a verb. This rules out all other choices.

Advanced

1. B. A "precaution," or "safeguard," is something that is put in place to avoid something bad happening in the future. The prefix "pre–" means before and "caution," means to be careful, usually of something dangerous, which makes the definition: something that is put in place before something dangerous happens. While "prevent" and "warn" seem like a good answer, these words are verbs and we are looking for a noun. "Safeguard" can be broken down into "safe" and "guard," which means to be away from danger and to protect from danger. "Safeguard" can also be a noun or verb.

2. B. A "principle" is an idea, or "concept." Do not get confused with "principal," which might make you choose "teacher." A "principal" is someone in charge of a school, while a "principle" is an idea or belief that someone has. To remember the difference, think of your principal as your "pal."

3. D. A "projection" is a guess about the future, or a "prediction." The prefix "pro–" means "forward," and the root word "ject" means "throw". The definition could either literally be "throwing [an object] forward," or "throwing [your mind] into the future." While you might think of something that displays an image on a surface, "television" and "screen" do not give the best definition of "projection." They are just words commonly associated with "projection." We can eliminate "devious" because it is an adjective and we are looking for a noun.

4. A. A "range" is the distance from one point to another, or a "length" of something. Something that is "dense" is heavy, while "average" has to deal with quality. Both of these are adjectives and can be eliminated because we are looking for a noun. A "portion" is a piece of something.

5. A. "Recognition," or "appreciation," is something you give to another person or group when someone has done something helpful or good. "Recognition" stems from "recognize," which means to acknowledge, and is made a noun through the "–tion" suffix, which means the "process or action of." This means the definition is "the act of recognizing or appreciating." Since we are looking for a noun we can get rid of "correct" and "bountiful," which are adjectives. "Assignment" is a task, while "knowledge" is someone's level of understanding something.

6. B. "Respiration" is the action of "breathing." The root word, "respire," means to breathe, while the suffix "–ation" means the "process or action of," which makes the definition: the action of breathing. Do not get confused with perspiration, which relates to "sweat" and "exercise."

7. B. To "augment" means to make bigger, or "boost." The root word "aug" means to increase, while the suffix "–ment" means action or result of, which makes the definition: the action of increasing. "Boost," or to increase, is the only answer that makes the most sense. This is a challenging word, so use it as an opportunity to learn a new root word or saying!

8. C. "Substance" is something that you can touch, or "material." While "substantial" may seem like a good choice because it looks similar, it does not mean the same thing. "Substantial" is an adjective and means very big, in importance or size. "Rotate" is a verb and means to move, while "lavish" and "greedy" are adjectives. "Lavish" means very rich, while "greedy" means selfish.

9. C. To "suppress" means to push down, or "smother." The prefix "sup–" means down or lower, while "press" means to push. "Exhibit" means to show, while "notify" means to tell someone something, and "manual" is a book of instructions.

10. E. A "committee" is a collection, or "group," of people who have come together to accomplish a certain task. Do not be tricked by the word "commit," which is a verb, or "chair," which is a position on a "committee."

11. B. "Thereby" means as a result of, or "thus." While all of the choices are adverbs, we can break everything down. "Before" means earlier than, or something that came first. "Always," means something happens all the time. "Between," means in the space of two things, while "beyond" means far or outside of something. Try using the words in a sentence to pick the best synonym.

12. E. "Trace" means to "follow," or "a small amount of." We are looking for either a verb or noun, so we can eliminate "catastrophic," since it is an adjective. "Linger" means to stay in one place for longer than needed, while "run" means to move faster than walking. This leaves "follow" as the best answer.

13. B. "Nevertheless," means "but," or "however." "Unless" means except, while "rightfully" means something belongs to someone by a rule or law. "Including" means to have everything considered. "Wherever," means "in every situation when."

14. B. When we "abbreviate" something we "shorten" it. The root word "brev" means short, while the suffix "–ate" makes the word a verb. We can eliminate "uniform" and "fewer," which are adjectives, and "briefly," since it is an adverb, because we are looking for a verb. To "reveal" means to show something to people who were not allowed to see it before.

15. C. When something is "absolute" there is nothing that can take away from it, or it is "certain." We can eliminate "comfort" since it is a noun and we are looking for an adjective. When something is "finite," it has limits, or an "end." Someone that is "curious" is interested to learn something.

16. B. Something that is "odd" is "weird," or "unusual." We are looking for an adjective, so we can eliminate "strangely," which is an adverb; even though "strange" would be a good answer, "strangely" would not.

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We can also get rid of "number," since it is a noun and "odd" is an adjective. Something that is "annoying" is something that bothers someone, while "benign," means "kind" or "gentlehearted."

17. A. When something is "abstract," it is an idea that cannot be touched, or "theoretical." Though art may be described as abstract, not all art falls under the category of abstraction. "Impact" means force, and when we are "hesitant," we are unsure. This leaves "theoretical" as the best answer. Just because something is abstract does not mean it is "general," or "vague."

18. B. When something is "final," it means the end, or "last." The root word "fin" means end and the suffix "–al" means relating to, which makes the definition: relating to the end. "Conclude" means to end, which makes it a verb. We are looking for a noun, making "last" the best answer.

19. D. When something is "exotic," it is not from the same country, or it is "foreign." The prefix "ex–" means from or out. In this case, when a fruit is shipped out to a different country to be sold, it is an "exotic," or "foreign," fruit. While "food" can be exotic, we are looking for the definition, which is "foreign."

20. D. When something is in "focus" it means it is in the center, or in the "spotlight." While a "lens," which is something that helps you see, brings a "precise," or specific, "focus" of something into view, these words do not define "focus." You can concentrate, or "focus" on an "issue," but that is also not defining "focus," but an example and it is the verb form. "Intensity" means powerful or strong quality, which leaves "spotlight" as the best answer.

21. E. To "fund" means to "provide" money for something (verb) or refers to a specific amount of money (noun). We can eliminate "mutual" and "dollar" because they are related to fund, but are not the definition of it. Whether the fund is entertaining or expensive is irrelevant to the meaning of the word.

22. D. An "objective" is something you work toward, or a "goal." A teacher's "objective," or "goal," is to help students learn. While we see the word "object," which is an "item," the suffix "–ive," which means "connected to" or "to have a quality of," changes the meaning.

23. E. A "policy" is a plan, or "rule," that is set in place to be followed. It is usually "political," or government–related, and may be related to "safety." While you may think you see "police" in the word "policy," but the suffix "–cy" means "the state of," which changes the meaning. By adding this suffix to "police," which means "to watch and make sure rules are followed," the definitions changes to the state of making sure the rules are followed. This makes "rule" the best answer.

24. A. When something is "adjourned," it means something has been finished, or "concluded." A "meeting," or a gathering of people, can be "adjourned." Or, court can be adjourned by a judge.

25. A. Something that is "insatiable" cannot be satisfied or controlled, or is "uncontrollable." To "satiate," which is the root of "insatiable," means to satisfy or to be full. The prefix "in–" means "not," while the suffix "–able" means "to be able." This makes the definition "not able to be satisfied." Someone who has "insatiable" "hunger," is always hungry. "Inconsiderate" has the same prefix, but it means not considerate or not polite. "Insulting," which means disrespectful, and "consecutive," which means in a row, are both adjectives, but not the correct answers.

26. A. "Major" means the most important, or "main," part. We are looking for an adjective which lets us eliminate "greatly," an adverb, and "soldier," which is a noun or verb. "Close" means to be near something. "Greatly" means "by a considerable amount," or "very much."

27. E. An "element" is a part of something. While element is also a scientific substance, we are looking for a definition and not examples, which is why "oxygen" or "water" do not work. "Contribute" is a verb and "temporary" is an adjective. We are looking for a noun, so that leaves "component," which means a specific part or piece of something.

28. D. Something that is "medicinal" has "healing" qualities. We can see "medicine" in the word, which typically heals, or cures, an illness. The suffix "–al" means "relating to," so the definition becomes "something relating to curing or healing." We are looking for an adjective, so we can get rid of "hospital," "headache," and "doctor" which are nouns, though they all relate to "medicinal." "Harmful" would be an antonym.

29. B. An advocate is someone who is a supporter of something or someone else. The root word "voc" means "call" or "speak," so we know that the person must have something to do with being vocal. Though a "powerful person" may advocate for others with less power, not all powerful people may choose to do so.

30. E. Notice that "delusion" is a noun because it ends in "–ion". We can therefore eliminate "elusive" since it is an adjective. "Delusion" is related to the word "delude," or mislead. This means it is not a "fact." A "liar" or "magician" can delude someone, but we are looking for a synonym, and both are nouns.
31. A. To "cease" means to "stop." We are looking for a verb, which is why "conclusion," a noun, does not work. While to "kill" is to end someone's life death, it is too specific. "Cease" looks like "crease," or "fold," but is entirely unrelated.
32. D. A "channel" is a narrow strip of water between two pieces of land that creates a "pathway" for "boats" to travel on. While a "boat" can be "sailing" on a "pathway," we are looking for the best definition, not words that are closely associated with the word. A TV contains channels, but they are not always for specific signals.
33. E. The "core" of something means the "center" or most important part of something, where everything else is surrounding it. While "core" is sometimes known as your stomach "muscles," since it is the centermost part of your body that can be "strong" or weak, it is not the correct definition, as there are many other types of muscles. When people have "core" "values," they have important beliefs that they stick to. "Value," "muscle," and "strong" are all words that are closely associated with core, but do not reveal the best definition.

Verbal – Analogies
Guided Practice – Antonyms
1. B. "Despicable" means "hated," which is the opposite of "lovable," making this an <u>antonym</u> analogy. "Distant" and "close" are also opposites. "Table" and "chair" are two different parts of a set, but they are not antonyms.
2. D. "Peaceful" and "rowdy" (loud, chaotic) are opposites, so this is an <u>antonym</u> analogy. "Learning" (to absorb new knowledge), and "forgetting" (to lose knowledge), follow a similar structure. "Charming" and "naïve" (innocent) are two different personality traits, but they are not oppositional – it is possible to be both simultaneously.
3. E. "Severe" is opposite of "mild" (a severe storm is devastating, a mild rain is light), so this is an <u>antonym</u> analogy. The pair that follows this structure closest would be "bond," or to make closer, and "separate."
4. D. "Picturesque," or beautiful, is opposite to "grotesque," which means ugly; therefore, this is an <u>antonym</u> analogy. Similarly, "diverse" means "different," and "identical" means the same, so they are also antonyms.
5. A. "Anxiously," or worriedly, and "calmly" are opposite feelings, making this an <u>antonym</u> analogy. "Lazily" and "energetically" are also direct opposites. "Daily" and "weekly" are two different descriptors of the same thing (time), and are not antonyms.
6. D. "Distinctive," or unique, is the opposite of "ordinary," making this an <u>antonym</u> analogy. "Never" and "always" also match this structure.
7. C. "Famous" and "unknown" are opposites, which signifies an <u>antonym</u> analogy. The best antonym for "separate" would be "together." For an association analogy, "equal" would work because of the saying "separate but equal", but that is the incorrect structure.
8. A. "Subsequent" (or next) is the opposite of "previous," making this an <u>antonym</u> analogy. "Obscure" means "not well known," and its best antonym would be "common." "Hidden" would be a synonym for "obscure", which is an incorrect structure.

Guided Practice – Cause–and–Effect
1. D. An artisan is a person who creates products, so this is a <u>cause/effect</u> analogy. Similarly, bacteria cause infections. To send an email is one action, and not a cause action and its effect.
2. A. You use your voice to make noise, which makes this a <u>cause/</u>effect analogy. Bees make honey. Wasp and stinger show the whole and its part, rather than a causal relationship.
3. E. Comedy causes people to laugh, so this is a <u>cause/effect</u> analogy. A radiator generates warmth. Security and danger are opposites, or an antonym analogy, rather than cause/effect.

4. C. To farm results in crops, so this is a <u>cause/effect</u> analogy. Similarly, radios create sound. A gesture is a type of signal, rather than an effect of signals, and affection does not necessarily cause output.
5. D. Labor, or work, can cause fatigue (exhaustion), so this is a <u>cause/effect</u> analogy. Similarly, projectors create images. "Pavement" is an effect rather than the cause of cementing – the order is reversed from the original structure.
6. E. Apologies can lead to forgiveness, so this is a <u>cause/effect</u> analogy. Similarly, happiness often leads to people smiling. While you might hear the tone after picking up the phone, the object of 'phone' is not the cause so much as the action.
7. E. Moisture in the air causes humidity, so this is a <u>cause/effect</u> analogy. Similarly, stretching often leads to flexibility. While rubber is stretchy, the analogy uses "stretch" as a verb rather than an adjective, and it would not be a cause/effect relationship in any case.
8. A. Loss leads to grief, so this is a <u>cause/effect</u> analogy. Similarly, the feeling of dissatisfaction leads to complaints. Because it is a negative emotion, it matches a negative outcome (complaint) rather than a neutral one (suggestion).

Guided Practice – Defining

1. C. A planet revolves around the sun, so this is a <u>definition</u> analogy. Similarly, the moon revolves around the earth. Both pairs are defined by a verbal relationship. Stars do not revolve around meteors; the order is reversed from the original structure.
2. A. A donkey pulls a wagon, so this is a <u>definition</u> analogy. Similarly, a horse pulls a carriage. Though there may be metaphorical attraction, literature does not physically pull a poet.
3. E. Arborists are people who care for trees, so this is a <u>definition</u> analogy. Similarly, gardeners care for roses. Fishermen catch fish, rather than taking care of fish.
4. D. Pirates search for treasure, so this is a <u>definition</u> analogy. Similarly, sailors search for land. A chest does not actively search for gold.
5. A. A cat plays with yarn, so this is a <u>definition</u> analogy. Similarly, a baby plays with toys. A sister may play with a child, but child is not an object, like yarn and toys.
6. B. A professor teaches a student, so this is a <u>definition</u> analogy. Similarly, a coach teaches an athlete. A sapling is more mature than an acorn, but it does not have a teacher/student relationship.
7. C. Water douses/reduces fire, so this is a <u>definition</u> analogy. Similarly, a beverage is used to reduce thirst. "Drink" is a synonym, and "juice" is a type of beverage, which are incorrect analogy structures.
8. E. A compass shows the direction, so this is a <u>definition</u> analogy. Similarly, a clock shows the time. A groundhog does not show its shadow, though it uses its shadow to show whether spring has arrived.

Guided Practice – Degree/Intensity

1. E. Something "toxic" is a more extreme version of "unhealthy," so this is a <u>degree/intensity</u> analogy. Similarly, "microscopic," or tiny, is a more extreme version of small. "Brilliant" is a more extreme version of "smart" and "countless" is the more extreme version of "numerous," but in both pairs the order is reversed from the original structure.
2. C. "Dry" is a less extreme version of "parched," which means very thirsty. That means this is a <u>degree/intensity</u> analogy. Similarly, "damp," or slightly wet, is the less extreme version of "drenched," or soaked through. "Secretly" is the adverb version of "secret," but they are not more/less extreme versions of each other.
3. D. "Unavoidable," or certainly, is a more extreme version of "likely," so this is a <u>degree/intensity</u> analogy. Similarly, a gash is a more severe wound than a scratch. "Lively" and "affectionate" are two different characteristics, and cannot be compared for degrees of intensity.
4. A. "Worship" is an extreme form of "like," so this is a <u>degree/intensity</u> analogy. In the same vein, "bawl," or cry uncontrollably, is a more extreme version of "sniffling," or starting to cry. "Fight" and "combat" are synonyms, and not different degrees of the same action.
5. B. An accident is a less extreme version of catastrophe, so this is a <u>degree/intensity</u> analogy. Similarly, a mishap or slight mistake is a less extreme version of a disaster. "Abnormal" and "unusual" are synonyms, and not different degrees of the same action.
6. D. "Warm" water is a less extreme version of "scalding" (very hot) water, so this is a <u>degree/intensity</u> analogy. Similarly, to "teach", or inform, is a less extreme version of "brainwashing," which means to

completely change someone's thinking. "Shake" and "stir" are different actions, so they cannot be compared for degrees of intensity.

7. B. To be a genius is a more extreme version of being smart, which makes this a <u>degree/intensity</u> analogy. A less extreme version of "ancient" is "old." A monument may be old, but it is a noun and not an adjective.

8. C. "Despairing" is a more extreme version of "sad," so this is a <u>degree/intensity</u> analogy. The less extreme version of "enraged" is "upset." While "discouraged" is also a negative emotion, it does not have connotations of anger, which are present in the word "enraged," so it is not as close of a match.

Guided Practice – Function/Object

1. A. A mask is used to hide, so this is a <u>function/object</u> analogy. Similarly, a cane is used to help a person walk. A person's sense of balance may be described as steady, but neither are the function of the other. All the other options are synonyms, which is the incorrect structure.

2. C. Countries use armies to defend themselves, so this is a <u>function/object</u> analogy. Similarly, cities use the police to protect their citizens, While cardboard may be recycled, recycling is not the main function of cardboard, and the order is reversed from the original structure.

3. B. Glasses are used to see better, so this is a <u>function/object</u> analogy. Similarly, the function of an accountant is to count, or organize numbers. The function of society is not necessarily to build trust.

4. D. Mail is used to communicate, so this is a <u>function/object</u> analogy. Similarly, assistants serve the function of aiding their superiors. Protection is a noun, not a verb.

5. A. The purpose of a pantry is to "save," or store, food. Therefore, this is a <u>function/object</u> analogy. Similarly, the essential purpose of a vacuum cleaner is to tidy. Although the function of a specific operation may be to define, that is not necessarily the case.

6. D. Synopses are used to summarize, so this is a <u>function/object</u> analogy. Similarly, the purpose of a rival is to challenge. Funding and taxing are antonyms.

7. B. The function of a conqueror is to win, so this is a <u>function/object</u> analogy. As follows, the function of a voter is to elect or choose. Though the other options are related to the topic of voting, they are not the functions of voters.

8. A. The function of a counselor is to advise, so this is a <u>function/object</u> analogy. Similarly, the purpose of a contract is to state an agreement. Although contracts are legal and must be signed, those are not its purpose but rather descriptors.

Guided Practice – Grammar

1. C. "Skipping" is the present participle of "skip," so this is a <u>grammar</u> analogy. Similarly, "tasting" is the present participle of "taste." Though "sleeping" is also the present participle of "sleep," the order is reversed.

2. D. "Ordered" is the past tense version of "order," so this is a <u>grammar</u> analogy. Similarly, "swam" is the past tense version of "swim." Note that not all verbs in past tense end with -ed. "Dug" is the past tense of "dig," but the order is reversed from the original structure.

3. E. "Catered" is the past tense of the base verb "cater," so this is a <u>grammar</u> analogy. Similarly, "informed" is the past tense of the base verb "inform." "Informs" and "informing" are not the base forms of the verb,

4. D. "Was" is the past tense of "am," so this is a <u>grammar</u> analogy. Similarly, "went" is the past tense of "go." "Gone" is the past participle of "go," not the past tense.

5. A. "Taught is the past tense of "to teach," so this is a <u>grammar</u> analogy. Similarly, "packaged" is the adjective version of "to package," or "to pack." Although "ate" is the past tense of "eat," the order is reversed from the original structure.

6. C. "Devastated" is the past tense of "devastate," so this is a <u>grammar</u> analogy. Similarly, the past tense of "contradict" is "contradicted." "Contradicting" is the present participle of "contradict," not the past tense.

7. B. "Foot" is the singular form of "feet," so this is a <u>grammar</u> analogy. Similarly, "mouse" is the singular form of "mice." Although "mouses" follows the conventions of plurality by ending in –s, this word is an exception to the rule.

8. C. "Knives" is the plural of "knife," so this is a <u>grammar</u> analogy. Similarly, "leaves" is the plural of "leaf." None of the other options show a plural form.

Guided Practice – Individual/Object

1. A. A designer uses a pen, so this is an <u>individual/object</u> analogy. A teacher uses a chalkboard. A label is not an individual, and "identify" is a verb, not noun.

2. A. A nurse uses a thermometer, so this is an <u>individual/object</u> analogy. Similarly, a biologist uses a microscope in his/her lab. "Cure" and "remedy" are synonyms, which is the incorrect structure.
3. C. A carpenter uses nails in his/her work, so this is an <u>individual/object</u> analogy. Similarly, a tailor uses a needle to sew. A warrant is used for an arrest, but that is a <u>function/object</u> analogy, since warrant is not a person.
4. E. A baker uses an oven to bake, so this is an <u>individual/object</u> analogy. Similarly, a chef uses a stove to cook. A bucket may be used to clean, but a bucket is an object, not an individual.
5. B. A driver drives a vehicle, so this is an <u>individual/object</u> analogy. Similarly, a cyclist rides a bicycle. Plumber is not an object/noun.
6. C. A shopper uses money to buy things, so this is an <u>individual/object</u> analogy. Similarly, a judge uses his/her gavel (small hammer) in court.
7. C. A pitcher throws a baseball, so this is an <u>individual/object</u> analogy. Similarly, a catcher uses a glove. Though the other options are related to baseball, they are not used by the catcher's role specifically.
8. E. A firefighter uses a hose, so this is an <u>individual/object</u> analogy. Similarly, a student uses a pencil to complete his/her work.

Guided Practice – Noun/Verb

1. C. Bread is "toasted," so this is a <u>noun/verb</u> analogy. Similarly, a trophy is "displayed." A hostage is "captured," but when paired with "captor", another noun, "hostage" and "captor" are antonyms.
2. E. A medal is earned, so this is a <u>noun/verb</u> analogy. Similarly, a present is wrapped. While a code may be unclear, "unclear" is an adjective and not a verb.
3. D. A path is followed, so this is a <u>noun/verb</u> analogy. Similarly, a secret is kept. While damage may be costly, "costly" is an adjective and not a verb.
4. E. A job is applied to, so this is a <u>noun/verb</u> analogy. Similarly, a mistake is made. While a rumor is spread, in this case the order is reversed, so it does not match.
5. E. A flame is extinguished, so this is a <u>noun/verb</u> analogy. Similarly, air is breathed. There are no other noun to verb combinations.
6. E. A newborn is nurtured, so this is a <u>noun/verb</u> analogy. Similarly, machinery is operated. "Friend" is another noun, not a verb.
7. A. A piece of paper can be cut, so this is a <u>noun/verb</u> analogy. The noun that best matches praise would be hero: a hero is praised. While "fool" and "candidate" are both nouns, they do not carry the same strongly positive connotations that "hero" does.
8. A. A snack may be devoured, so this is a <u>noun/verb</u> analogy. The noun that best matches enforce would be "rule": a rule is enforced.

Guided Practice – Part/Whole

1. C. A stanza is part of a poem, just like a paragraph is a part of an essay, so this is a <u>part/whole</u> analogy. Similarly, a letter is part of the alphabet. "Jar" and "lid" are two parts of one whole, rather than relating as a part to a whole.
2. C. Five fingers make up a hand, so this is a <u>part/whole</u> analogy. Similarly, many bricks make up a wall. A car and a bus are both types of a vehicle, rather than a part of a whole.
3. B. Many branches grow in one tree, so this is a <u>part/whole</u> analogy. Similarly, many slices make up a pie. Though an airplane may make several flights, a flight is not a physical part of an airplane (as opposed to, for example, the cockpit).
4. E. A dune is made of many grains, so this is a <u>part/whole</u> analogy. Similarly, a window may contain several panes (sections). Beaches are not composed of boulders, though there may be a boulder on a beach.
5. D. Many pigeons together are known as a flock, so this is a <u>part/whole</u> analogy. Similarly, many floors exist in a building. A duck and a duckling are two types of the same thing, rather than a part and a whole.
6. C. More than one violinist can be found in an orchestra, so this is a <u>part/whole</u> analogy. Similarly, a mall contains many stores. Flag and pole are two parts of one whole, rather than relating as a part to a whole.
7. B. An army is made up of soldiers, so this is a <u>part/whole</u> analogy. A group of ants is known as a colony. Hives usually refer to groups of bees or wasps, not ants.
8. A. A constellation is formed of many stars, so this is a <u>part/whole</u> analogy. Similarly, a square is formed of four sides connected together.

Guided Practice – Purpose/Object

1. E. Tape is used to stick paper together, so this is a <u>purpose/object</u> analogy. Nails are used to stick boards together. While a recording may be used to make a speech, the speech is the purpose itself, rather than another object being used in the purpose.
2. C. A period is used to end a sentence, so this is a <u>purpose/object</u> analogy. Similarly, a finale is used to end a play. A dynamite causes an explosion rather than ends it.
3. D. A sponge is used to clean a dish, so this is a <u>purpose/object</u> analogy. Similarly, a broom is used to clean a floor. A mop and soap are both cleaning materials, but a mop is not used to clean soap.
4. B. A rifle is used with a bullet to shoot, so this is a <u>purpose/object</u> analogy. Similarly, fertilizer is used with dirt in planting. While a weapon is an object, "illegal" is not.
5. C. Calculators are used to process numbers, so this is a <u>purpose/object</u> analogy. Similarly, a knife is used to process (or cut) food. While thunder and lightning go together, they are not objects being used for a particular purpose.
6. D. A chisel is used to carve stone, so this is a <u>purpose/object</u> analogy. Similarly, a chainsaw is used to carve wood. A pill does not share the same purpose as a chisel.
7. D. A recipe is used to prepare for a meal, so this is a <u>purpose/object</u> analogy. Similarly, a map is used to prepare for a trip. Though a map may be used with a compass, a map cannot be used to prepare a compass. A map is used to locate a harbor, not to prepare a harbor.
8. B. A lotion is used on a rash, so this is a <u>purpose/object</u> analogy. Similarly, a bandage is used on a wound. A bandage is not necessarily used on a leg.

Guided Practice – Type/Kind

1. E. Violet is a type of color, so this is a <u>type/kind</u> analogy. Similarly, titanium is a type of metal. To "stretch" is not a type of reflex. Though an order, or command, may be seen as a type of request, the order is reversed from the original structure.
2. A. A lion is a type of animal, so this is a <u>type/kind</u> analogy. A café is a type of restaurant. Barbarian and savage are synonyms, not types of a kind.
3. A. A canoe is a type of boat, so this is a <u>type/kind</u> analogy. A sandal is a type of shoe. Regret may be seen as a type of consideration, but the order is reversed from the original structure.
4. D. A rose is a type of flower, so this is a <u>type/kind</u> analogy. A basketball is a type of ball. While the other options are of related words, they are not types of the same kind.
5. B. An emerald is a type of mineral, so this is a <u>type/kind</u> analogy. Similarly, football is a type of sport. A story is not a type of fiction, as they are synonyms.
6. E. A sculptor is a type of artist, so this is a <u>type/kind</u> analogy. Similarly, knitting is a type of hobby. A vault is a type of storage, but the order is reversed from the original structure.
7. C. A pediatrician is a type of doctor, so this is a <u>type/kind</u> analogy. The only type of fruit listed is an apple. A potato is a type of vegetable, not fruit.
8. B. A greeting is a type of interaction, so this is a <u>type/kind</u> analogy. Similarly, a sofa is a type of furniture. The other options are associated with furniture, not types.

Guided Practice – Synonym

1. E. "Accidentally" and "unexpectedly" share the same meaning of "not on purpose," so this is a <u>synonym</u> analogy. "Sleepy" and "drowsy" also share the same meaning. "Feeble," which means weak, is not synonymous with "age."
2. E. "Envious" has the same meaning as "jealous," so this is a <u>synonym</u> analogy. "Enchanted" and "charmed" also have the same meaning. While a skyscraper is a type of building, not all buildings are skyscrapers, so the two words do not share one meaning.
3. D. "Infamous" has the same meaning as "notorious," or "famous" in a negative way, so this is a <u>synonym</u> analogy. Similarly, "toxic" has the same meaning as "poisonous." While "vacate" sounds similar to "vacation," it means "to empty" or leave, which is not the same as "travel."

4. A. "Malicious" has the same meaning as "spiteful," so this is a <u>synonym</u> analogy. Similarly, "blazing" has the same meaning as "scorching": they both mean very hot. "Earn" is a verb and "dollars" is a noun, so while they are associated, they are not synonyms.
5. A. "Stealthily" has the same meaning as "sneakily," so this is a <u>synonym</u> analogy. Similarly, "promptly" and "punctually" share the meaning of "on time." While "proprietary" means "liking ownership," it is an adjective and not a verb, so it is not a synonym to "own."
6. A. "Fragile" has the same meaning as "dainty," so this is a <u>synonym</u> analogy. Similarly, "merely" has the same meaning as "only." While "loud" and high volume may be synonymous, "volume" by itself is neutral, and means how loud or quiet a sound is.
7. C. "Timid" has the same meaning as "shy," so this is a <u>synonym</u> analogy. One meaning of "remote" is distant, or "far." A remote is associated with television, but they are two different objects.
8. D. "Doubtful" has the same meaning as "uncertain," so this is a <u>synonym</u> analogy. The best synonym for "suspicious" is "skeptical," which means questioning. Unquestionable is the antonym, and while the other words are commonly associated with suspicious, they do not share the same meaning.

Mixed Practice

1. C. A "village" is a small town, while a "metropolis," or sprawling city, is the more extreme version. That means this is a <u>degree/intensity</u> analogy. The best match is "deep" and its more extreme version, "bottomless." Although a "cub" is a baby version of a "bear," the order is reversed from the original structure.
2. E. A shield is used to defend oneself, so this is a <u>function/object</u> analogy. Similarly, a party is used to celebrate some joyful occasion. Though a chorus can bring people together, that is not its main function.
3. C. Tornadoes cause destruction, so this is a <u>cause/effect</u> analogy. Similarly, medicine can lead to good health. Though composters create operas as well, the order is reversed from the original structure.
4. C. A rubric is used to determine a grade, so this is a <u>purpose/object</u> analogy. Similarly, the law is used to determine punishment. An item is not used to determine a catalog, and a curtain is not used to determine a rod.
5. B. A researcher uses an encyclopedia to look up information. That means this is an <u>individual/object</u> analogy. Similarly, a cartographer uses a map to document their findings. Adversary and enemy are synonyms, which is the incorrect structure.
6. E. "Illogical" shares the same meaning as "nonsensical," so this is a <u>synonym</u> analogy. Similarly, "divert" and "redirect" mean the same thing. "Conspire" (as in conspiracy) is not to be confused with "perspire," which means to sweat.
7. A. A mixture is concocted, so this is a <u>noun/verb</u> analogy. Similarly, a pupil is educated. While a compartment may be sealed, the order is reversed from the original structure.
8. E. "Vital," which means "essential" or "necessary," is the opposite of "unnecessary," making this an <u>antonym</u> analogy. Similarly, "junior" is the opposite of "senior." The other options are all synonyms.
9. D. A t-shirt may be a part of an outfit, so this is a <u>part/whole</u> analogy. Similarly, a layer may be part of a cake (which can be multi–layered). "Cotton" and "silk" are different types in a category, but silk does not contain cotton, and vice versa.
10. D. "Graduated" is the past tense version of the verb "to graduate," which means this is a <u>grammar</u> analogy. Similarly, "watered" is the past tense version of the verb, "to water." While "celebrated" is the past tense of "celebrate" and "instructed" is the past tense of "instruct," the order is reversed from the original structure.
11. E. Tuna is a type of fish, which makes this is a <u>type/kind</u> analogy. Similarly, a snake is a type of reptile. "Lure," which means to tempt, and "catch" do not have a type to kind relationship.
12. B. A ballerina performs ballet, so this is a <u>definition</u> analogy. Similarly, a singer performs opera. Though a singer may use his/her voice, an orchestra, or a songwriter to support their performance, none of those describe what the singer performs.

Reading Comprehension
Fiction
<u>Passage #1</u>

1. C. *Main Idea.* The passage captures how a boy and an old man respond to a potentially dangerous bear. Upon being confronted by the bear, the boy and the old man retreat from the trail they are walking. Once the bear leaves, the two characters resume their journey. This reaction can best be described as sensible, as the characters behave responsibly in the face of danger. The story does not have a violent ending, the characters do not act foolishly, nor do two friends come to distrust each other. While the story revolves around a dangerous confrontation, it is not clear that one character has led the other into that situation.

2. D. *Detail.* After the bear growls, the boy prepares his bow and arrow. This reaction can best be described as a "precaution"—if the bear begins to attack, the boy will be ready to defend himself and the old man. Because the boy "never remove[s] his eyes from the bear," we can infer that the boy is remaining calm. Because the boy never in fact uses the bow, however, resorting to violence is too extreme of an answer. The old man and the boy do not make a joke, do not run away, nor does the old man advise the boy about what to do next.

3. C. *Detail.* To betray can mean to trick or deceive, but it can also mean to divulge, or show. In the passage, the bear is described as demonstrating a "growing annoyance", at which point the boy and the old man retreat from the trail. The best answer is therefore "revealed," since the sentence describes how the characters observed something.

4. D. *Tone/Mood/Style.* The passage tracks in great detail a possibly dangerous conflict. Only by the end of the passage do we come to understand that the boy and the old man are left unharmed. Sentences beginning with "suddenly," "then," and "finally," help maintain the tension of the story and contribute to a suspenseful mood. There is nothing comedic, uncertain, scholarly, or overjoyed about the passage.

5. E. *Inference.* After the bear disappears, the boy begins to grin. He then comments on the size of the bear and chuckles. Given that the boy is able to joke about the bear, we can infer that the boy has a sense of humor about the conflict. The boy did not refuse to back down from danger, is not more frightened than the old man, nor is he quick to make irresponsible decisions. Given the boy's responsible reaction to the bear, it is clear that he has encountered grizzly bears in the past.

Passage #2

1. E. *Inference.* The passage begins with Lucy exclaiming that she wouldn't be able to tolerate Miss Archer praising Rosamund. Later, she asks Miss Archer to promise not to "make a favorite of Rosamund" because Rosamund has "upset everything already." It can therefore be inferred that Lucy dislikes Rosamund, not that she is indifferent to (doesn't care about) Rosamund. The other choices are positive emotions.

2. B. *Main Idea.* The passage centers on Lucy, an upset young girl, and Miss Archer, of whom Rosamund asks a favor—their interaction can best be described as "an exchange." "Bitter conflict" is too strong, nor does the passage suggest that the two characters cannot come to a "resolution." Rosamund asks Miss Archer to make a promise, but the characters do not make a vow to one–another. The passage does not focus on the positive qualities of a new student nor the class schedule.

3. D. *Detail.* In response to Miss Archer's questions, Lucy confirms that she "was born here" and that "this house has always been [her] home." Miss Archer replies that "of course you would feel strange at first with all these girls scattered about the place." In other words, Lucy is feeling upset because there are now other girls in her home. The passage makes no mention of Lucy being in conflict with the Professor, being unable to complete her lessons, disliking school, or feeling betrayed by Rosamund.

4. E. *Detail.* At the end of the passage, Lucy remarks that "the other girls have done nothing but obey [Rosamund]." It can thus be inferred that Rosamund has captured the respect of the other girls. The passage does not indicate that Rosamund dislikes Miss Archer, is jealous of Lucy's status, is well behaved, nor refuses to obey instructions.

5. D. *Inference.* The passage indicates that Miss Archer "knew human nature" and could guess that "Lucy was feeling troubled." It can be inferred then that Miss Archer has an understanding of human emotion. The passage does not suggest that Miss Archer is not willing to obey all of Lucy's wishes, does not care about Lucy's feelings, is suspicious of Rosamund, nor unfamiliar with Lucy's family life.

Passage #3

1. D. *Main Idea.* The passage describes the moment at which a young horse becomes old enough to be broken in. It goes on to detail what breaking in a horse entails and what the training demands of a horse. Put generally, then, this a passage about an important moment in a horse's life. While the passage discusses what breaking in a horse means, it does not necessarily mention *how* a horse is broken in, nor is this primary focus of the passage.

2. E. *Detail.* The passage mentions that a broken in horse must learn how to wear a breeching, "move exactly how the rider wishes," and "have a cart or a carriage fixed behind." Broken in horses are also expected to "never become alarmed at what he sees," or, in other words, not become distracted. The passage mentions that horses may become tired, but they still must obey their riders – it does not claim that horses must be able to gallop without tiring.

3. A. *Detail.* Use context clues to understand who the "I" refers to in the passage. Sentences like "I was now beginning to grow handsome; my coat had grown fine and soft…" and "When I was finally four years old, Squire Gordon came to inspect me. He examined my eyes, my mouth, and my legs, and then made me walk, trot and gallop in front of him" help us to understand that the speaker in this passage is the horse himself.

4. A. *Tone/Mood/Style.* The words "beautiful," "bright," and "black" all begin with the letter "B." The occurrence of closely connected words beginning with the same letter or word is known as alliteration.

5. B. *Inference.* The passage claims that once broken in, a horse cannot "have any will of his own." It goes on to say that a broken in horse "may neither jump for joy nor lie down for weariness." We can thus deduce that a broken in horse does not have the freedom to behave on its own. Instead, it must often follow a very strict code of conduct. The passage does not mention that a broken in horse is always tired, is no longer unique, must leave his master, nor becomes less valuable to others.

Passage #4

1. E. *Detail.* The passage describes Matthew as "an odd–looking person," so we can assume that "ungainly" has a negative charge. Indeed, ungainly means clumsy or inelegant. "Thin," "bright," "elegant," and "standard" do not have a negative connotation we are seeking. Therefore, "awkward" is the best answer.

2. D. *Detail*. The passage suggests that Matthew dreads women because he has the "uncomfortable feeling that all other women were secretly laughing at him." The passage says nothing about the women remembering him as a boy, assuming he has a bad temper, secretly wishing to speak to him, nor not understanding why he is not married.

3. B. *Detail.* While the second paragraph begins by describing Matthew's unique relationship to women, it is primarily concerned with his appearance. We learn specific details about Matthew's looks, including his figure, "stooping shoulders," and the beard he has had since the age of twenty.

4. C. *Inference*. Matthew is described as walking past the girl "as quickly as possible without looking at her." Previously, the reader was told that "Matthew dreaded all women" with a few exceptions. His low self–esteem and feeling that everyone is talking about him tells us that he is uncomfortable in many social situations, especially those involving women.

5. E. *Inference*. The passage describes the girl as being "tense and full of expectation." It goes on to say that "she was sitting there waiting for something or somebody." We can therefore deduce that the girl is nervous about the person she is waiting to meet. There is no indication in the passage that the girl is Mrs. Rachel's daughter, that she is excited to meet Matthew, that she is late to her next appointment, nor that she does not have a ticket and thus cannot wait inside.

Passage #5

1. A. *Details*. The poem describes wraith–like water, but not in the sense of a ghost floating above the water (wraith–like describes the movement of water). The person is not walking alone looking at buildings, but instead, watching a swan disappear as he swims through trees and water toward a distant place.

2. D. Inference. We are told that it is autumn, a time for the leaves of trees to turn a different color. From context, we can infer that a beech is a tree, since the poem describes "their" branches. The author paints a picture of the swan swimming beneath the leaves of trees.

3. B. Inference. It can be helpful to read poems twice: once without pausing at the end of each line, and once pausing at the end of the line. If we read without pausing, we can see that the author writes, "With red–tipped head and wings – a beaked ship under sail – there glides a single swan." The placement of "ship under sail" (and the fact that it is called "beaked") tells us this is referring to the swan, an animal.

4. D. Tone/Mood/Style. Personification is the act of attributing human behavior to inhuman objects. In this case, the author is comparing beeches to people. Beeches don't have heads, and can't bow like people can; and yet, the author tells us that they do. The other choices are simply descriptions of actions.

5. D. Tone/Mood/Style. The mood is how the reader is made to feel. Don't confuse this with tone, which is the author's point of view about something. In these lines, we are greeted with words like "dusk" and "mist" and "lonely" and "dim." These words are not positive, so we can rule out "joyous" and "mellow."

We do not feel embarrassed by what we read, nor do we feel violent. Instead, we feel an ominous, negative vibe that can be said to be brooding. The preceding stanza ends with trees bowing "dark heads."

Passage #6

1. C. *Tone/Mood/Style.* The romantic mood of the poem is established by romance–related words like "faithful," "lover," and "passionate." The romantic mood creates a generally positive atmosphere – all other answer options are incorrect because they focus on negative emotions.

2. A. *Inference.* The entire poem references the intimacy between the Moon and the Earth. This is especially evident in lines 3 and 4: "The pallid, faithful Moon, has been the one/Companion of the Earth. Her tender face." There's no uncertainty or hostility/anger in the relationship.

3. C. *Main Idea.* The first stanza is mostly about the Moon's companionship with the Earth. While other celestial objects, like the Sun, are mentioned in the first stanza, its main idea focuses in on the loving relationship that has existed between Moon and Earth since the beginning of time.

4. D. *Detail*. The word "beaten" here is describing the path; the phrase "beaten" *path* is used in the English language to describe a trail or path or road that is "well–trodden," or used often.

5. B. *Tone/Mood/Style*. By describing the Moon as having a "silvery smile," the author is using a technique known as personification – s/he is attributing a nonhuman entity (the Moon) with human–like characteristics (a smile).

Passage #7

1. A. *Tone/Mood/Style*. The poem is descriptive because it constantly uses of imagery to stimulate the senses. It references the "smell" and "whiff" of tulips (lines 1 and 11), which stimulates the readers' sense of smell; it references the "greenish–white" water (lines 3 and 8), which stimulates the readers' sense of sight; it even references "water flow[ing] over [the narrator]" (line 8), which stimulates the readers' sense of touch. The entire poem is therefore very descriptive. It is not essay–like or persuasive, as it would then employ the use of argument, facts, and statistics.

2. B. *Detail*. The author hints several times that "beryl" (line 8) might be a synonym for "greenish–white" (lines 3 and 8) or "green" (line 9). This conveys that it is a quality of sight rather than smell, hearing, speech, or imagination.

3. A. *Main Idea.* The entire poem references the joy of taking a bath. It highlights the "sunshine pour[ing] in at the bath–room window" (line 2) and it repeatedly focuses on the bath–tub water (lines 2–10). While tulips, narcissuses, beautiful day, a crow (bird), and jeweled water are all mentioned, these are details that contribute to the larger theme about the joy of bathing.

4. A. *Inference.* While a crow is mentioned, the author's laugh is not caused by the crow. The author is laughing simply because she "let the green–white water, the sun–flawed beryl water, flow over [his/her body]" (lines 7–8). He/she does not hear a joke or laugh at something he/she remembers – it is a laugh that stems from a simple bath on a beautiful day.

5. C. *Tone/Mood/Style*. There are no references to fear, surprise, nervousness or depression. But there are constant references to pleasure and play, as best captured by the author's laugh (line 7) and the author's promise to "lie [in the tub] awhile [to] play with the water and the sun spots" (lines 9–10).

Passage #8

1. C. *Tone/Mood/Style.* The author describes the scene in a lively matter, noting the "thrill" (line 3) that it brings and the ways in which the sun sets the town "ablaze" (line 14).

2. E. *Inference*. The boats are not literally on fire; rather, they are just reflecting in the sun. The sun rises in the east, so lines 1 and 9 are hinting at the sunrise.

3. C. *Detail.* By describing the east as growing "yellower apace" in line 9, the poem is referring to a sunrise brightening a coastal scene. The boats are not literally on fire (answer A) – they are just reflecting in the sun.

4. A. *Detail*. This line is an example of a simile – it compares two unlike things using "like" or "as." It says that the "east is yellow as a daffodil," comparing an eastern sunrise to a flower.

5. B. *Detail*. When the poem states that the "east is as yellow as a daffodil" (line 1), it is talking about the sunrise. The "three steeples…thrust up from the town" (lines 2–3) is referencing the rooftops of churches pointing into the sky. "Gnarled poplars" (line 3) is a type of tangled tree. And "some keen salty gust" (line 4) is referring to a sea breeze. Thus, these lines are about the sun rising to the east, which illuminates a scene in which church rooftops point to the sky and trees sway in the sea breeze.

Passage #9

1. A. *Tone/Mood/Style.* The phrase "We were very tired, we were very merry" (lines 1, 7, and 13) best captures the mood because it is repeated often and focuses on the emotions of the two protagonists of the poem. "We had gone back and forth all night on the ferry" (lines 2, 8, and 14) is also repeated but offers a *detail* rather than focusing on the overall mood or feeling. The details all serve to expand upon the idea that though the two went around the city all night, and were tired, they did so because they were having fun.
2. C. *Detail.* Line three states that ferry was "bare and bright, and smelled like a stable." A synonym for "bare" is "empty." And a word to describe smelling "like a stable" is "foul-smelling."
3. A. *Inference.* This lines reference to the sun rising and "dripping a bucket full of gold" is a metaphor for dawn, when the sun rises.
4. E. *Detail.* The stanza describes how they greeted a "shawl–covered head," who thanked them for the apples and pears, suggesting that the two people had given the leftover fruit to the person. The group also gave money to the person (all "but our subway fares").
5. C. *Main Idea.* The poem is mostly about staying up all night and having fun on the ferry, which is captured by the repeated phrase "We were very tired, we were very merry…We had gone back and forth all night on the ferry" (lines 1–2, 7–8, and 13–14). While the subway (answer B) is mentioned at the end of the poem, it as much of a symbol of the good night as the ferry.

Passage #10
1. E. *Main Idea.* The entire poem is a detailed description of an onlooker's experience viewing a path broken by a waterfall and longing to see where that path leads. This main idea is captured in key lines such as (lines 2–3) and (lines 19–24). We know that the scene is not real because of line 19, when the speaker states that it is "only a pictured path."
2. B. *Detail.* The entire first stanza is a detailed description of a scene in nature, which highlights a path that "winds along the face of a cliff" (line 1) and has a waterfall that dashes over it (line 3). While the speaker does mention the "thunderous voice of waters" (line 5) and the "silver torrent" (line 6) created by the waterfall, he/she only uses these phrases to reference the power of the waterfall that dashes across the path. These phrases are not used to reference a dangerous place, an actual thunderstorm or the best way to cross a torrent.
3. C. *Tone/Mood/Style.* In the third stanza, the narrator is yearning to get a closer look at what is "beyond the fall" (line 15). The exclamatory statement "Oh!" (line 13) hints at the intense yearning inspired by the scene.
4. C. *Detail.* The "dampness" (line 13) is caused by the waterfall mentioned in the previous stanza (line 3). There is no mention of a flood, thunderstorm, lake, or melting glacier.
5. E. *Inference.* The "jeweled spray" (line 10) discussed in the second stanza is likely describing the rainbow–colored mist that is created when the sun reflects off the splashing waters of a waterfall. The word "jeweled" (line 10) is used to create a multi–colored image that looks much like the sparkle of many different–colored jewels.

Non–Fiction

Passage #1
1. B. *Main Idea.* The passage overall focuses on the process behind vaccines, from how antibodies occur naturally (lines 6–7), to how vaccines work with the immune system (8–11). Side effects, and vaccines for travelers, are details rather than the main idea. There are no counterarguments given for against vaccinating, so this is not a persuasive piece.
2. D. *Inference.* By using the context clue of "vaccines reduce the risk of infection" (lines 1–2) earlier in the same sentence, readers can infer that "immunity" means being less at risk to disease, or having resistance. And since it does not say "eliminate the risk of infection," clearly vaccines are not able to fully prevent disease.
3. A. *Detail.* The text explicitly states: "Once it fights off the infection, the body has a supply of cells, or antibodies" (lines 6–7). It is not the multiplication of germs/infection itself that produces the antibodies, but rather the body's successful fight against the disease. If a person never got sick, they would not produce antibodies, and there is no evidence that fever is necessary for antibodies to develop.
4. D. *Detail.* While vaccines imitate infections, they do *not* cause illnesses (line 8–9). The text supports all the other statements: multiple shots (line 15), supporting the immune system (line 2), fever symptoms (lines 11–12), recognizing diseases (line 10–11).

5. B. *Inference*. While disadvantages of vaccines – such as causing fevers – are listed, they are described as "minor" (line 12), and the advantages are emphasized: "the diseases vaccines prevent can be dangerous, even deadly… [vaccines] work with the body's natural defenses to *safely* develop immunity" (lines 1–3). This implies the advantages outweigh the disadvantages. There are no details in the text referring to expenses or parental choice, and is it the *disease* that is dangerous/deadly, not the vaccine.

Passage #2

1. D. *Tone/Mood/Style.* This phrase adds to the patriotic tone by vowing to protect the universe from a "hostile flag" (line 7), which is used to describe countries that are adversaries to the United States. The continual references to "country" (lines 1–3) and "Nation" (lines 10 and 12) offer context clues that convey a sense of deep national pride, or patriotism. While it may be taken as an aggressive statement, later in the same sentence it argues for the American "banner of freedom and peace", implying that this conflict/competition is not meant to be solved be violence.

2. B. *Main Idea.* The common title for this speech by John F. Kennedy is "We Choose to Go to the Moon" due to the repetition of this phrase in line 15. While the principles of freedom, peace, and being a leading nation are referenced in the passage, it is mostly about the United States' quest to be the first nation to go to the moon.

3. B. *Inference*. In the opening paragraph, the author starts by listing all the technological revolutions that the U.S. led in prior generations. As something the current generation intends *not* to do, "founder" is contrasted with "leading", and "sink" is closest as an anonym of "leading" or "riding" the waves. "Backwash" (line 4) is an additional clue that implies falling behind or being forgotten. Founder in other contexts can refer to creators or owners, but is not used thus here. And while patriotism does influence the tone the word founder is not used here to reference a Founding Father or patriot.

4. D. *Inference*. A previous phrase in this sentence provides some context for this answer: "our *leader*ship in science and industry, our hopes for *peace* and *security*, our *obligations* to ourselves as well as others" (lines 11–12). The author continually references the U.S. as a leader and the first among other nations throughout the text, he uses to legitimize the United States right to "make this effort" (lines 12–13). It is clear that the author believes U.S. *is*, indeed, ready for the coming age of space as opposed to not being ready. Nuclear power and the industrial revolution are mentioned as introductory details, and are not the main focus of the passage.

5. C. *Detail*. The author directly states, "We choose to go to the moon in this decade *not* because it is easy" (lines 15–16). Words like "trailblazer" (line 5) and "effort" (line 13), also imply that this will not be a simple task. The other answer options are stated as reasons: the need to solve scientific mysteries (line 13), organize energies and measure skills (line 16–17).

Passage #3

1. A. *Tone/Mood/Style*. Throughout the passage, the article is arguing that climate change will have disastrous effects (line 3), cause more flooding (line11), and more severe storms (line 13–16). The passage ends with a call to action: "I challenge all of you here" (line 21–22), showing that it is a persuasive speech. While scientific evidence is included, these facts serve to further the argument. There is no evidence to show that is related to a presidential campaign, and since it is addressed to "facility managers, farmers, and executives," it cannot be a private letter.

2. B. *Details*. In the context of lines 19–20, "it's not just alarmists who say climate change will be devastating… it's common sense," 'alarmist' must be someone who does *not* have common sense, or "panic(s) unnecessarily". There is no reference to the flood victims arguing against climate change.

3. A. *Main Idea*. The main idea is evident in the last sentence: "we must come together to make it work" (line 22). While the author's urgency may imply that some people are ignoring or not doing enough to solve the problem of climate change, it is never stated directly, nor central to the text.

4. B. *Inference.* In lines 21–22, the author directly addresses his audience of "facility managers, farmers, lawmakers and executives*"*. There is no evidence to show whether or not the author assumes that this audience believes or does not believe in climate change. And while he uses an example of flooding in the Midwest, that does not mean that the audience is necessarily residents of the area.

5. B. *Details*. The author follows up on "written by a tree–hugging enviro?" with a resounding "Nope" (lines 17–18). He is refuting the argument that environmental change is not true because environmentalists are not a credible source, since his source is a reputable insurance company. While the phrase itself might seem disdainful of environmentalists, he is actually using it to argue with the disdain that his audience feels.

Passage #4
1. B. *Main Idea.* The passage details how early man interacted with fire and came to control it using a variety of methods. The passage does not address how to make a fire in the woods. While the passage address human diet, lightning storms, and the bow drill, these details do not encapsulate the general idea of the passage, but are important details.
2. A. *Detail.* The author indicates that "one of the biggest turning points in human history" came when man was able to set fires at will – this came about due to the bow drill, which allowed for man–made fires. Employing prehistoric tools is not specific enough to effectively answer the question. Other answers address important aspects of human history, but are not assessed to be the most impactful. Dung was used to preserve fire, but didn't let people create fire at will.
3. E. *Detail.* The author claims that while wildfires could benefit humans, they were also a "significant threat to human life." The word "though" implies that wildfires could have both a positive and negative effect on humans. The passage does not indicate that lightning is unpredictable, that humans preferred not to interact with fire, that wildfires destroyed crops, or that historians cannot predict when man began interacting with fire.
4. B. *Inference.* In context, this sentence serves as a transition from the previous paragraph, where people were simply attempting to extend the life of fires, to the current paragraph, where people are described of being able to create "man–made fires." This suggests that the "turning point" was being able to set fires as desired. This doesn't imply that this is done without a reason or without any help.
5. E. *Detail.* Animal dung was used to maintain naturally occurring fires (created by lightning) so that it could be transferred to other areas. It was used to cook foods, not preserve them. There's no mention of animal dung being used in religion or medicine. The dung would trap the fire, and wasn't itself a source of heat.

Passage #5
1. A. *Main Idea.* The passage sets out to describe the largely unknown development facility at Menlo Park and the contributions that facility made to the light bulb. While the passage is giving credit to people other than Edison, it is not crediting "specific people" – all we know is that the research facility contributed to the light bulb's discovery. Thus, this choice is too focused in its scope. The passage does not argue the importance of various inventions, describe the lasting impact of an invention, or describe the life experiences of a famous inventor.
2. B. *Inference.* The passage claims that "Edison used this celebrity to claim credit for the light bulb." Edison also receives as much credit as possible for the light bulb. The author doesn't directly compare the importance of inventions. The author doesn't suggest that Edison receive no credit (beware of absolute statements), just that others should receive some credit.
3. C. *Detail.* The word "myriad" is used as an adjective that describes "tests." The following sentence tells us that there were "many experiments," so we can infer that there were "many" tests. We know that these were not simple tests, since the "achievement" took a long time to finish (as inferred by the use of the word "finally" in line 10).
4. A. *Detail.* The second paragraph details "the development of the light bulb." The piece also begins by describing the light bulb as likely being Edison's most famous invention. It can thus be inferred that "crowning achievement" refers to the light bulb.
5. C. *Inference.* The sentence in question begins by claiming that Edison was already considered to be a genius by the public. "Celebrity" thus refers to Edison's stature in the public eye, or "fame", as being instrumental in allowing Edison to claim sole credit for the light bulb.

Passage #6
1. E. *Detail.* The passage indicates that "depending on whom you ask," the smile depicted in the *Mona Lisa* could be interpreted as "cheerful or suspicious." Given this uncertainty, "baffling," or difficult to understand, is the best answer.
2. E. *Inference.* The author establishes that the theft of the *Mona Lisa* sent France into an uproar. We can assume that because someone as famous as Pablo Picasso was investigated, the investigation was intense. Notice the trigger word "even," which gives us a clue about the author's point of view on the rest of the sentence.
3. B. *Detail.* The author states that "some claim" the Mona Lisa's fame is due to Mona Lisa's smile, but that "the truth" is "far more dramatic." The author states that it is thanks to Peruggia's theft that the painting became popular.

4. C. *Tone/Mood/Style.* The passage seeks to educate readers about the *Mona Lisa*'s history. The tone of the passage is best described as informative.
5. D. *Inference.* The passage suggests that an example of the "public outcry" that led to the Mona Lisa's popularity was that news of the painting "plastered the front page of newspapers for weeks." The author suggests that such attention was the reason for the surge of visitors to the Louvre after the painting's recovery.

Passage #7

1. B. *Main Idea.* The thesis of the article is that e–cigarettes "should be banned across the globe" (lines 4–5). The second paragraph (lines 6–14) go on to explain how e–cigarettes are *not* a healthier alternative to traditional cigarettes.
2. E. *Inference.* "Big Tobacco" (line 2) is used as a synonym for "traditional cigarettes" (line 3). The "toxic effects of nicotine" is not the right answer because nicotine content can be found in both traditional cigarettes and e–cigarettes (lines 8–9).
3. D. *Tone/style/mood.* The tone of the claims in this passage can be describes as assertive because the author makes strong, straight–forward claims such as "[e–cigarettes] should be banned across the globe" and "these restrictions are not enough" (line 20). The claims are not indecisive; rather, they are very decisive, one–sided, and *assertive*.
4. E. *Inference.* The word ploy most likely means "trick" because the word ploy is used in a sentence as a noun that represents dishonest marketing tactics. In this case, dishonest (line 3) is not a synonym for a trick, but a quality of the trick. It is an adjective, not a noun.
5. E. *Details.* The example of "70 countries…regulating e–cigarettes" (line 15) is a *response* to the unhealthy nature of e–cigarettes, but it is not an *example* of the unhealthy nature of cigarettes. All other claims highlight health concerns.

Passage #8

1. E. *Main Idea.* The passage seeks to explain why olive oil and vinegar do not mix together. The author says nothing about how to make salad dressing or the specific types of oil and vinegar that mix well. While the passage touches on why acetic acid is polarized and why charged molecules attract one another, they do not encapsulate the general purpose of the passage.
2. E. *Inference.* The passage states that substances with evenly distributed electrons, such as oil, are non–polar. Because "non–charged atoms like to stick together," it can be inferred that they are not attracted to polarized molecules.
3. C. *Detail.* The passage states that acetic acid and water are both polar molecules, and polar molecules attract other polar molecules. Acetic acid and water are thus drawn together to form vinegar. Polar molecules have charges. The passage does not discuss salad dressing ingredients or the fact that acetic acid and water naturally occur in oils.
4. B. *Detail.* The author states that olive oil is made up of non–polar molecules, while vinegar is made up of polar molecules. Because polar and non–polar molecules do not attract each–other, vinegar and olive oil cannot be permanently mixed. Vinegar contains water, ruling out the first choice. The passage does not mention anything about strength being needed to mix oil and vinegar, nor does it mention that they cannot be mixed because of a lack of electrons.
5. C. *Tone/Mood/Style.* The passage maintains an educational tone throughout, explaining a phenomenon through detailed scientific processes. Flowery describes writing that is full of elaborate words and phrases. The passage does not contain slang (like euphemisms or turns of phrase), is not overly wordy (with long sentences filled with extra words that don't add to the meaning of the sentence), and is not vague in its explanation.

Passage #9

1. D. *Tone/Mood/Style.* Onomatopoeia is the writing of a word based on a sound associated with how it is written. The *sssss* sounds like the fizzing of a soda bottle. This is not used to compare (metaphor) or exaggerate (hyperbole) or give human qualities (personification). Alliteration involves similar sounds across multiple words.
2. E. *Detail.* The passage states that the sound made by opening a soda bottle is "unassuming enough but is actually caused by a complex series of chemical reactions." In other words, the sound may appear unassuming, but it is actually quite complicated. The word "but" tells us that the opposite of complex must be true – that it is "simple."

The Tutorverse
MAKING THE UNIVERSE BRIGHTER, ONE STUDENT AT A TIME

3. C. *Tone/Mood/Style.* The passage seeks to explain the science behind a commonly witnessed phenomenon. As such, it is reasonable to believe that this passage was taken from a science textbook. Although the passage is concerned with food or drink, it is more focused on the science behind a specific phenomenon.
4. E. *Detail.* The passage states that liquid in a bottle absorbs carbon dioxide until it reaches equilibrium. Equilibrium is defined as occurring when there is "the same amount of gas dissolved in the liquid as there is in the space at the top of the bottle." The pouring of liquid or combining of water with flavor doesn't have to do with the gas. When the bottle is opened, the equilibrium is disturbed (the "balance is broken") and bubbles form.
5. E. *Inference.* The passage states that the bubbling in soda is actually caused by carbon dioxide bubbles escaping the bottle. However, this can only occur when the bottle is opened and the soda water is exposed to the normal pressure in the air. The passage makes no indication of soda not being sealed properly, soda bottles not being pressurized, nor some soda not being infused with carbon dioxide.

Passage #10
1. B. *Detail.* All sentences in paragraph 1 provide details about plastic in the ocean, but "it can do serious harm to animals that eat it" explains most directly how it hurts the environment. That plastic collects in large amounts and floats on the ocean's surface is described as a negative, but by itself does not describe what is damaging about plastic.
2. E. *Detail.* It can be inferred from context clues in the following sentence that "biodegrade" has to do with how easily something is broken down in the environment. Since plastic is described as "not break[ing] down the way that plants and animals do," we can infer that plastic's ability to last a long time is the opposite of "biodegrade."
3. D. *Main Idea.* Other choices describe only part of the focus of the passage. The purpose of the passage is not simply to describe plastic or garbage in the ocean, or to specifically describe a particular species, but to describe how there might be a natural solution (caterpillars; bacteria) that might help us clean it up.
4. D. *Inference.* Paragraph 1 explains why plastic is a threat to the environment, but paragraph 2 introduces two species of animal to show that scientists are still learning about how living things digest plastic.
5. D. *Inference.* While the author may think that plastic is bad for the environment, and that people should use less, there is no evidence to support this in the passage. Instead, the passage focuses on how we can use nature to help us manage plastic waste.

Final Practice Test (Form B)
Section 1 – Quantitative

1. A. *Numbers – Order of Operations.* Within the parentheses, evaluate the multiplication and division operations from left to right. $(8 × 6 ÷ 12) = (48 ÷ 12) = 4$. Then, evaluate the exponent. $2^2 = 4$. Next, evaluate the division operation. $4 ÷ 4 = 1$. Lastly, evaluate the subtraction operation. $40 – 1 = 39$.
2. D. *Numbers – Percent.* To find percent change, plug the new and original values into the equation $\frac{new-original}{original} = \frac{90-80}{80} = \frac{10}{80} = \frac{1}{8} = 0.125 = 12.5\%$.
3. A. *Numbers – Decimals.* When adding numbers with decimal points, make sure the decimal points are aligned properly: the decimal points in the two addends and the sum must be all vertically aligned. If it helps, write $12.400 + 1.247$.
4. B. *Measurement – Time & Money.* 120 stitches divided by 6 equals 20 stitches.
5. B. *Numbers – Basic Computation.* Use long division. When 55 is divided by 7, the quotient is 7 and the remainder is 6. Bring down the zero and divide 60 by 7 which is 8 with a remainder 4. Bring the 9 down and divide 49 divided by 7 which is 7. Therefore, the final quotient when 5,509 is divided by 7 is 787.
6. C. *Measurement – Mean, Median & Mode.* If the average score was 78, and there were 3 students, then their combined score is equal to $78 + 78 + 78 = 234$. If one student brought his score up by 6 points, the total is now $236 + 6 = 240$. To find the new average, divide by 3: $240 ÷ 3 = 80$.
7. E. *Numbers – Fractions.* If Raul had 3 dozen roses, then he had $3 × 12 = 36$ roses total. If he sold $\frac{1}{9}$ of the roses each day, multiply $\frac{1}{9} × 36$ to find the fraction of how many roses he sold each day. $\frac{1}{9} × 36 = 4$. The total number of roses over 4 days he sells is $4 × 4 = 16$. To find how many roses he has left, subtract 16 from 36: $36 – 16 = 20$.

8. C. *Geometry – Circles.* If the radius of a circle is 9 inches, then the diameter is 18 in. Plugging 18 for *d* and 3.14 for π into the equation $C = πd$ yields $C = 18 × 3.14$. Rather than computing the product 18 × 3.14, we can estimate using 18 × 3 = 54. The only answer choice close to 54 is 57.

9. D. *Measurement – Area, Perimeter & Volume.* Each side of a cube is equal in length. The volume of a cube = (side × side × side) or (side)^3. If the cube's side measures 3 feet, then the volume is (3 ft × 3 ft × 3 ft) = (3 ft)^3 = 27 ft^3.

10. E. *Algebra – Solving Equations and Inequalities*. Subtracting a negative number is equivalent to adding: –(–17) = +17. The equation can therefore be written as $–4z + 17 = –3$. Subtract 17 from both sides: $–4z = –20$. Divide both sides by –4. Dividing a negative expression by a negative expression yields a positive expression, so $z = –20 ÷ –4 = 5$.

11. D. *Pre–Algebra – Spatial Reasoning.* The area of the circle on the right is $πn^2$. The area of the second circle is $\frac{4n^2}{9}$, since $2.25 = \frac{9}{4}$. The radius of the second circle, therefore, is $\frac{3n}{2}$, since area = $πr^2$.

12. D. *Data Analysis & Probability – Circle Graphs.* According to the circle graph, 4% more students take the train than ride the bus. To find 4% of the 450 students total, convert 4% into the decimal 0.04 and multiply by 450: 0.04 × 450 = 18.

13. A. *Numbers – Place Value.* Evaluating 100 × (50.8 ÷ 100) yields 50.8 since multiplying by 100 and then dividing by 100 will not change the value. Use process of elimination to determine which expression is equal to 50.8, which is 508 × 0.1.

14. C. *Algebra – Multi-Step Word Problems.* Two boxes of 34 cookies contain 34 × 2 = 68 cookies. Subtract the two cookies left over after the rest are handed out; 68 – 2 = 66 cookies are given to the students. If each student receives exactly three cookies, there are 66 ÷ 3 = 22 students in the class.

15. A. *Numbers – Basic Computation.* 14 × 16 is 224. When 224 is multiplied by 75, the product is 16,800.

16. B. *Algebra – Interpreting Variables.* First, cube 2 to evaluate the exponent. 2 × 2 × 2 = 8. To solve for *k*, isolate *k* on one side of the equation 8 + *k* = 20 by subtracting 8 from both sides. 20 – 8 = 12. Therefore, *k* = 12.

17. C. *Algebra – Solving Equations and Inequalities*. The expression can be written as 13 + *w* = 6*x*, where *x* is a whole number and 6*x* is a multiple of 6. Use the answer choices to evaluate: 13 + 5 = 18; 13 + 11 = 24; 13 + 13 = 26; 13 + 17 = 30; and 13 + 23 = 36. Since 18, 24, 30, and 36 are multiples of 6, and 26 is not, the answer is 13.

18. C. *Measurement – Angles*. The sum of the interior angles of a triangle is 180°. Because this is an isosceles triangle with *AB* = *BC*, angle *BAC* and angle *BCA* are congruent. 180 – 24 = 156, so the sum of the measures of angles *BAC* and *BCA* is 156°. Since each angle has the same measure, the measure of angle *BAC* is equal to 156 ÷ 2 = 78°.

19. A. *Numbers – Whole Numbers.* Prime numbers are defined as natural numbers that have only two distinct factors: 1 and itself. Of the answer choices, 67 is the only prime number.

20. C. *Numbers – Decimals.* Rewrite 6.38 as 6.3800, since terminal zeroes after a decimal point have no effect on the value of a number. Now, subtract with the decimal points all vertically aligned: 6.3800 – 0.0027 = 6.3773.

21. D. *Numbers – Decimals/Fractions/Percents.* To convert a percent into a fraction, write the percent divided by 100: $190\% = \frac{190}{100}$, which reduces to $\frac{19}{10}$. Since 10 divides into 19 one whole time with a remainder of nine, $\frac{19}{10} = 1\frac{9}{10}$.

22. C. *Numbers – Place Value.* Rounded to the nearest whole number, 89.74 in becomes 90 in and 2.54 cm becomes 2.5 cm. Multiply to estimate the number of centimeters: 90 × 2.5 = 225. The nearest answer option to this is 200.

23. E. *Statistics – Compound Events.* P(Three correct answers) = P(Correct) × P(Correct) × P(Correct) = $\frac{1}{5} × \frac{1}{5} × \frac{1}{5} = \frac{1}{125}$.

24. B. *Data Analysis & Probability – Interpreting Line Graphs.* The problem is asking for the years in which earnings were more than $5 million. This happened in 1998, 2002, 2003, and 2004. In 1997, 1999, and 2001, earnings were exactly $5 million, which is not the same as more than $5 million.

The Tutorverse
MAKING THE UNIVERSE BRIGHTER, ONE STUDENT AT A TIME

25. E. *Data Analysis & Probability – Histograms*. The question asks how many Fort Riley residents belong to both the 21-40 and 81-100 age categories. 25% of the population is between the ages of 21-40, while 10% is between the ages of 81 and 100. 25% + 15% = 35%.

Section 2 – Reading

1. E. *Tone/Mood/Style.* The sentence in question compares "the dread of failure" to a "fog" – such a direct comparison is known as a metaphor. A simile is a similar figure of speech but must use "like" or "as" in making a comparison. Hyperbole is exaggeration. An idiom is an expression that is not meant to be taken literally. Something cliché is overused.

2. D. *Detail*. The passage claims that the facts Willow "needed to know were precisely those which she could not remember." Willow is thus unable to remember crucial information. While Willow struggles with English History, the passage does not suggest that she hates the subject (she likes Lady Jane Grey as a topic, for example). It also does not mention that she must listen to Patrick's advice, nor that she failed to pay attention in Miss. Hamilton's class. The passage suggests that Willow could be distracted by other students but chooses not to. It does not claim that Willow cannot help being distracted.

3. D. *Inference.* In recalling Patrick's advice, Willow notes that his recommendation was "a long shot" and fears that it "wouldn't be satisfactory." It can therefore be deduced that she reacts to his advice skeptically, or uncertainly. "Animosity" is too strong, especially because Willow ends up using Patrick's advice.

4. C. *Main Idea*. The passage begins with Willow experiencing "the dread of failure" as she looks over her test. As she recalls Patrick's advice, however, Willow becomes more optimistic about doing well on the test. Therefore, we are looking for an answer choice that features a shift from a negatively charged noun to a positively charged noun. "Despair to hopefulness" fits this template.

5. D. *Detail*. The passage indicates that "the pathetic tragedy of the young Jane Grey had always appealed to [Willow's] imagination." Jane Grey's life fuels Willow's creativity; it can thus be inferred that Willow chooses Jane Grey because she can write about the historical figure in a poetic manner, per Patrick's advice. The passage does not claim that Jane Grey has similarities to Willow, that she was Patrick and Willow's favorite artist, that she led a satisfactory life, nor that she is the only historical figure Willow remembers.

6. C. *Main Idea.* The author implies that the purpose of the passage is to celebrate the creative accomplishments of the Harlem Renaissance, which is a specific historical moment: "writers of the Harlem Renaissance, whom we focus on today" (line 9), "The words of these writers opened us to the truth at a time when it most needed to be heard" (lines 18-19). Though it references the social injustices that African Americans faced at the time (lines 2, 10), it does not discuss legal or political changes. Similarly, though it discusses the difficulties African American artists faced (lines 10, 16), it does so to celebrate their accomplishments rather than to convince readers to avoid becoming artists. Zora Neale Hurston and Langston Hughes are both mentioned as examples of artists from this time period, but major life events are not given.

7. A. *Inference.* The first paragraph gives ample detail of the reality that African Americans faced at the time, from not having fair wages (line 3), to not having freedom of expression (lines 4-5). It can be inferred that this 'stark' reality is a negative, or harsh one. Also, the sentence in which the word appears gives another clue. The writers "celebrated their culture…while capturing the stark realities of being black in America" (lines 9-10), where 'celebrated their culture' is contrasted against the 'stark reality'. This means that 'stark' must be an unambiguously negative word, unlike 'complex' or 'untold'. And though their work played the important role of standing "witness to an important historical moment" (line 12), there is no evidence of actual rebellion or political activism, since witnessing is a passive act.

8. E. *Inference*. The quote from Zora Neale Hurston is a metaphorical rather than literal statement; she compares sorrow to a kitchen, and 'licking out all the pots' becomes a descriptor for consuming/feeling a great deal of sadness. It is not describing a literal kitchen or lack of table manners.

9. B. *Detail*. In lines 12 and 13, the author explains: "African-Americans fleeing the racism of the South found a welcome haven in Harlem". In addition to directly mentioning racism in the South, the word 'haven' implies that other places also felt racially tense. Though African American people *did* enjoy going out on the town, it *was* an inspirational place, and Langston Hughes *did* write his famous poem there, these are all due to Harlem being a safe space from racism.

10. B. *Details*. The quote from Langston Hughes also illustrates the greater point, of how writers from the Harlem Renaissance captured "the stark realities of being black in America" (line 10). In that sense, it is not a different point of view from Zora Neale Hurston; if anything, their writings are both examples of how artists expressed the emotional reality of the time. While the quote is a testimony to the inequality during the 1920s, it does not give information about the cause of the inequality. There is no mention of the two writers being friends or of the Harlem Renaissance fading away.

11. C. *Tone/Mood/Style.* Throughout the entire poem, the author's tone is cautious, which is reflected in his warnings in lines 6-7 and line 12. When the author says it is "no fit place for a child to play" (line 12), it conveys to the reader his/her tone is just the opposite of comical or playful, and yet there is no indication that the author is tired or angry.

12. D. *Inference*. Key words like "wet rocks" (lines 1 and 4), "tide" (lines 1, 4, and 5), "barnacled white" (line 2) and "bottom of the sea" (line 8) all hint that the setting takes place near a rocky beach. Nevertheless, there are no key words that indicate that a ferry is involved in the coastal scene.

13. C. *Main Idea.* The word "tide" (lines 1, 4, and 5) is not only the most repeated word in the poem, but it is also scattered throughout the poem with descriptive language, such as "faint and perilous" (line 6) to describe the powerful and perilous effects of the tides. While there are references to giants, children, and aquatics, the poem is not literally about giants, it warns that the tides are "no fit place for a child to play" (line 12), and its emphasis is on tidal changes, not aquatic lifecycles.

14. E. *Details*. All other answers are used to describe the rocks through lines 1-5, but "no fit place" (line 12) is actually describing the entire beach.

15. E. *Inference*. While the author describes high tide as a "house full of wonderful things and new" (line 11), he/she also describes high tide as "faint and perilous" (line 6), "a place to die" (line 7), and "no fit place for a child to play" (line 12). According to the poem, the rocks only become "beautiful green" (line 3) when the tide is low, but then disappears into the dangers of the perilous waters when the tide is high.

16. E. *Main Idea.* The central claim of the article is that cell phones are not dangerous for humans. More specifically, the passage states that cell phones do not cause cancer. The passage does not claim that medical x-rays should be avoided (they're described as dangerous in large doses only) or that new x-rays have been discovered. While the passage suggests that cell phones may be distracting and that they are increasing in number, both of these headlines are too specific and do not address the main point of the passage.

17. C. *Inference.* The author supports his claim that cell phones are safe by comparing an increase in cell phones to a stable rate of cancer occurrences. In order for this comparison to be established, "dramatically" must be replaced by a word that communicates an increase in cell phone use. "Substantially," which means "greatly," helps the reader understand that there has been a significant increase in cell phones.

18. D. *Inference.* The author claims that while cell phones may be a cause for concern, they are not physically dangerous. The author also reminds us that while radiation can cause cancer, cell phone radiation is harmless. His tone is thus one of courteous disagreement. Because the author disagrees with the idea that cell phones cause cancer, the tone cannot be "total understanding," complete acceptance," nor "lack of interest." The author is not suspicious of the idea that claim that cell phones cause cancer – he fully disagrees with them.

19. E. *Inference*. The article claims that cell phone usage increased between 1987 and 2005, but cancer rates did not. This implies that cell phones are not harmful to humans. If cell phones *were* harmful, cancer rates would be expected to rise. Thus, the trends help support the author's main point that cell phones are harmless.

20. B. *Detail*. The author claims that only radiation with high-energy rays is dangerous. High-energy radiation is called "ionizing." Because cell-phones emit non-ionizing radiation, which is not harmful, it can be inferred that radon gas is more harmful than cell phones. Radios produce similar radiation to cell phones, so radon gas is more dangerous than radios. The same is true of microwave ovens. While medical x-rays are also ionizing, and thus harmful, the passage does not indicate whether radon gas would be more powerful than medical x-rays. We do not have enough information to compare radon with medical rays.

21. A. *Main Idea.* The final three sentences hint at Douglass' belief that knowledge can lead to a better life: "What was possible for me is possible for you. Strive earnestly to add to your knowledge" (lines 14-16). There are also references to schooling (line 7) and learning (line 8) in the passage. While the word

"ignorance" (line 15) is used, it is referenced as something that should be avoided, and his hard work and merit were both essential for his success.

22. D. *Detail*. Douglas had to "crawl under the barn or stable to secure [these] eggs" (line 5). This highlights the fact that the eggs were taken or *seized*. While he did end up consuming the eggs, this happened in a later sentence/action. Likewise, while secure can also mean protect, fortify, fasten, or lock, it does not carry the same meaning in this context.

23. A. *Inference*. According to the passage, "Schools were unknown to [Frederick Douglass], and he learned to spell from an old Webster's spelling book. He learned to read and write from posters on cellars and barn doors" (lines 8-10). This indicates that Douglass was self-taught or self-directed. Though one might infer that he was very disciplined in order to learn in such circumstances, there is no direct textual evidence supporting this idea. There are also no statements supporting the tedious or private nature of his education, and since it was entirely free, his education was not expensive.

24. B. *Tone/Mood/Style.* When read in conjunction with the previous sentence – "He eventually held several high positions in society and accumulated a decent amount of wealth" (lines 10-11) – this statement highlights how far Frederick Douglass came from his past of extreme poverty, supporting his message of hopefulness. While sharing food with dogs initially sounds despairing, it is used in this context to demonstrate Douglass's triumph over his dire circumstances. And, though the outcome was positive, Douglas speaks of his past in a somber rather than cheerful way. There is no evidence in the passage that shows resentment, or a sense of community.

25. B. *Detail*. The passage indicates that Frederick Douglass was intelligent and resourceful. His intelligence is highlighted by his ability to learn on his own and rise to prominence (lines 7-12), and his resourcefulness is shown in his efforts to stay warm and fed (lines 2-6). While he was orphaned (line 1), there is no direct or indirect reference to his depression. He only became wealthy and well-known later in life (lines 10-12).

26. D. *Details.* The context states that fossil fuels are found buried in the ground, so it can be inferred that they must be pulled out of the ground to be used. Thus, the answer is D.

27. A. *Main Idea*. The second paragraph does describe how people used the different parts of a whale, but this paragraph occurs within the larger context of a description of why whaling in the United States grew and eventually declined.

28. E. *Details.* The passage does say that sending out whaling ships had become too expensive, the reason that it had become too expensive was that fossil fuels had begun to replace whale oil, contributing to the industrial boom in the United States.

29. A. *Inferences.* The author uses the phrase "gone the way of the whale" to say that the whaling industry, like whales themselves, was heading towards extinction. We know this because the whaling industry is described as declining. Earlier in the passage, we know that the whales were hunted "to near extinction."

30. D. *Inferences*. The passage as a whole describes the US whaling industry's importance and decline. The second paragraph, which describes the uses of whales parts, comes in response to the question "What made people hunt these giants of the sea to near extinction?" It is not primarily concerned with showing how people lived in the past, and it does not make any argument about whether whaling is right or wrong.

31. E. *Tone/Style/Mood.* The author writes that the mines "were hotter than the sun." This is an exaggeration—if the mines were truly hotter than the sun, no human-being could ever work in them. An exaggeration of this sort is known as a hyperbole.

32. E. *Detail.* To "permeate" means to spread through, or penetrate something. In context, the passage indicates that sunlight is unable to pass through the mines. We know this because "it was difficult to tell if it was night or day" in the mines. This means that sunlight can't shine down, or penetrate, the darkness.

33. A. *Inference*. The author claims that even though the miners heard noises at night, "they knew they were alone." Further, the author claims that at night it "*sounded* like the mountain was more full of miners at night than it ever was during the day." The implication here is that miners typically work during the day. The goblins are so noisy at night, however, that one might mistakenly think that the mine was full of miners.

34. E. *Detail*. The passage asserts that "goblins hate every kind of song, most likely because they did not know how to make any themselves." It can thus be reasoned that goblins do not like songs because they "are unable to sing songs of their own." The passage does not claim that songs interrupt the goblins' work,

that the goblins cannot understand the songs, have trouble hearing at night, nor that the songs echo loudly throughout the mines.

35.   C. *Inference*. The passage suggests that songs are the best defense against goblins. Thus, according to the author, "miners who could not make up songs nor remember old songs were truly afraid of the goblins." This suggests that a miner who is unable to memorize any songs would have no defense against goblins and would therefore be terrified. Curdie and Peter Peterson are cited as being courageous in the face of goblins, and we can infer from the passage that miners familiar with older songs and miners able to create their own songs would not be afraid of goblins.

36.   B. *Tone/Mood/Style.* The tone can be considered one of "admiration" because it continually uses positive words like "impressive" (line a), "honor" (line b), "skill" (line c), and "effective" (line d) to describe Abraham Lincoln's public speaking capabilities and how others viewed his speaking capabilities. Although the tone is positive overall, it is not specifically joyful. All other answer choices convey a sense of negativity or reservation, which is not apparent in the passage.

37.   D. *Inference*. The next line directly after refers to Abraham Lincoln as a "effective speaker" (line 4). It can be assumed from references to the Gettysburg Address and his audience of "the masses" (line 17) that Lincoln was giving public speeches, and was a public speaker. Although he was historically known for being an honest and powerful person, this particular passage focuses solely on his speeches. There is no evidence in the text to show that he was a victim or a crime, or a talented writer.

38.   B. *Main Idea.* The words "speaking" (line 1), "orator" (line 3), "speaker" (line 4), and "speech" (line 5), and "speeches" (line 12) pervade the passage, indicating that the text is focused mostly on Abraham Lincoln's speaking skills. While references to his famous phrases, events of presidency, and his celebrated Gettysburg Address are all present in the passage, these are details rather than the main focus of the text.

39.   B. *Inference.* Throughout the paragraph, the word "short" is repeated in reference to Lincoln's sentences. It can be inferred that the detail about the Gettysburg address is supporting this idea, and that "monosyllabic" is a synonym to short. While the text mentions Lincoln's intentionality, it does so in the context of his simplicity. "Boring" and "complicated" are opinions that are not stated by the author.

40.   D. *Detail*. Based off the "for example", this quotation is an example that reinforces the idea in the previous sentence, "Lincoln's sentences were usually short." It is further reinforced by the beginning of the next sentence "Lincoln didn't just keep sentences short…" (line 10). While the Gettysburg Address, Robert G. Ingersoll's view of Lincoln, and his assassination are mentioned at other parts of the text, they are not written in relation to the given quote.

Section 3 – Verbal

1.   A. To "omit" something is to leave it out, exclude it, or forget to include it. It doesn't mean to "ensure", "pull", or "perform". The root word "mit" means "send," but the prefix "o–" has actually been shortened from "ob–", or against.

2.   D. Something that is "prime" is the "best" quality of something. We can describe places as prime. For example, some say the prime spot for exercising outside in New York City is in Central Park. There are "prime" numbers, such as 1, 3, 5… etc., but that is not describing what prime means, and is instead an example.

3.   C. To be "destructive" means to be "harmful," or cause a lot of damage. We can "demolish," or destroy, something, which would be "destructive," but we are looking for an adjective and "demolish" is a verb. This gets rid of "interpret," which means to understand and explain the meaning of something. To be "civil" means to be polite and "monstrous," which is have ugly or scary features (like a monster), is not the correct definition.

4.   A. An "enclosure" is any closed of space, or area. The prefix "en–" means inward or inside, and the suffix "–ure" means the condition or action of, so an "enclosure" is when things are put inside a space. An enclosure can be made up of "fencing," but we are looking for the best definition, and not simply a related word. "Stop" may seem like a possible answer, but do not get confused with seeing the word closure or closed in the "enclosure." An enclosure might stop things from leaving the space, but it is not the correct definition.

5.   E. To "create" something means to "make" something new. An "inventor," or someone who has made something no one else has yet, can "create" a "product," or something that can be touched and sold for

money. To "copy" something is the opposite, or antonym, of "create," and means to make something in the image of something else, or to make identical.

6. A. To "target" means to "aim," or to focus on. For example, you can "aim," or point, an "arrow," or a pointed weapon that flies through the air that is shot with a bow, during "battle." We can eliminate "acquire," since that is a verb and we are looking for a noun. Do not confuse it with the large department store.

7. E. "Furthermore" means "additionally," or also. "Furthermore" is typically used as a transition word, or a word that connects two separate ideas. While it may seem like "furthermore" might seem like a measurement of distance, think about if any of the options make sense. "Distant" and "many" are both referring to two different parts of the word, which is a sign that they might be trick answers. To "tally" something means to keep score or count of something.

8. B. To "revive" means to bring back to life, or "resurrect." The two words share the same prefix, "re–," which means again. The root word "viv" means life, so the definition of "revive" is to live again, while the root word of "resurrect" is "surrect" which means upright, which makes the definition upright again. "Alive" might seem like a good choice, but we are looking for a verb, not an adjective. A "canine" is any animal related to dogs, while "immortal" is an adjective that means living forever, which is the opposite of "revive" and "resurrect." To "append" means to add.

9. B. To "dispel" is to "drive away," or to make disappear. The root word "pel" means to drive or force, and the prefix "dis" means apart or away, which creates the definition: to drive away.

10. B. "Extensive" means "a lot" or "large" in amount or size. The best word to describe "extensive" is "thorough." While "depth" covers a large area, we are looking for an adjective, and "depth" is a noun. "Thorough" is an adjective and means to cover every detail or task.

11. B. If something is "positive," it is good or helpful, or "beneficial." We can eliminate "personality," "outcome," and "quality" because they are nouns and we are looking for an adjective. "Obtain" can also be eliminated because it is a verb, which leaves "beneficial." The root word "benefit" means "a positive aspect", and "-cial" modifies it into an adjective.

12. E. Notice that all four other choices are synonyms, which means the last choice must be the correct answer. Something unnecessary is "superfluous". Don't be afraid to pick a choice that MUST be right even if you don't know what it means!

13. C. When you "injure" something you "hurt" it. We are looking for a verb, so we can eliminate "bandage" and "unjust," which are a noun and adjective. We can "rest," or take a break to recover, and use a "bandage" to help us get better after we "injure" ourselves, but these words do not explain what "injure" means. To "rectify" means to make right or fix.

14. C. To be "energetic," means to be very active or "lively." The root word, "erg," means work, and is most commonly seen in "energy," which means the power to do work. If we add the suffix "–etic" to energy, it makes the word an adjective. The only answer is lively that makes sense is lively. Something energetic may or may not be amazing or adorable.

15. E. When something is "significant," it is important, or "meaningful." When we break down "meaningful" to the root word, "meaning," and the suffix "–ful," we can see the definition: full of meaning, or importance. We are looking for an adjective, which allows us to eliminate "amplify," "transmit," and "represent," which are all verbs. Something that is "similar" is when something looks almost the same as another.

16. E. A "mechanism" is something that works with other parts to create something as part of a process. "Reliable" and "metallic" are adjectives and can be eliminated since we are looking for a noun. A "mechanic" is someone who repairs machines and not analogous. While a "mechanism" is usually part of a machine in a "factory," or a place that uses machines to create things, "factory" does not define "mechanism," which leaves "process" as analogous.

17. B. To "proclaim" something means to announce, or to "say." The prefix "pro–" means to put forth and the root word "claim" means to "call out." "Say" is the only answer choice that makes sense.

18. E. When we "enable" something we let something happen, or "permit." The prefix "en–" means to cause and "able" means to have the ability to do something, so to "enable" means to cause someone to something.

19. D. If something is "mature," it is at a higher state of development than other things, or "sophisticated." For example, if you are "mature" for your "age," you act older than your real age. "Age" is not the correct

answer because it is a noun and does not give the correct definition. When you are "qualified," you are able to do a certain job. It does not necessarily mean you have to be "mature" to do a certain job. "Allege" means to claim something and "attractive" deals with things that are nice to look at.

20. C. When something is "enormous," it is very big, or "giant." The suffix "–ous" means full of. While "vastly" also means very big, it is an adverb (most adverbs end in "–ly") and we are looking for an adjective. An "elephant," which is also very large, is a noun and not the definition but an example of something that is "enormous." While "normal" shares a common root word "norm," the definition means average or usual, not "very big".

21. E. An "image" is something that can be seen that resembles something in real life, or "picture." In your "imagination" or "mind," or head, you see images. A "portrait" is a specific picture of a person, and is too specific in this case.

22. D. To "distort" something means to change or "warp." A "transformer" is something that changes, but it is a noun and we are looking for a verb. The only other verb besides "warp" is "straighten," which means to make something not crooked and is the opposite of "distort."

23. C. "Impatience" is a feeling when you want something to happen sooner rather than later. You are "restless." While "nervous" might seem to work, it is an adjective and we are looking for a noun. "Excitement" is a noun, but not the best definition. A lot of "excitement" might lead to "impatience," but something that causes another thing does not mean it is the right definition.

24. A. When something is "improbable" it means it is not likely going to happen, or "unlikely." We are looking for an adjective, so "fraction" and "beneficiary" can be ruled out. "Certain," which means something that is definitely going to happen or known for sure, is the opposite of "improbable." Something that is "problematic" is hard and not analogous, which leaves "unlikely" to be the best answer. Another way to find the answer is breaking down the word. The prefix "im" means without or not and the suffix "–able" means able to be, while the root word "prob" means prove. The definition of "improbable" means something that cannot be proven.

25. E. To "file" means to "categorize" or organize, usually by putting documents a cabinet or box for easy use. While file can also be a noun (something that holds loose papers), none of these options below fit this definition. The only verb in the options is "categorize." The other options are words that are closely associated with "file."

26. D. "Agony" is extreme suffering. It may last for some period of time ("duration"), and may be solved by some "remedy," but the best synonym is one that matches the direct meaning: "suffering."

27. B. To "supplement" means to "add" to something. When we supplement something, we are increasing it or making it bigger. The suffix "–ment" means action or result and the root word "sup" means full of, making the definition: something that makes another thing fuller, or big. To "reduce" means to make something less or smaller, which is the opposite of "supplement." This is a challenging word, so use it as an opportunity to learn a new root word or saying!

28. B. When something is "eventual," it is coming to an end soon. "Ultimate" can also mean "final". Because it is an adjective, we can get rid of "ended," which is a verb. "Lasting" and "perpetual" both mean something that has no end, which is the opposite of the definition of "eventual." "Eventful" is when something is full of exciting events or occurrences, which is not the right definition.

29. C. When something is "definite" it is clear and certain, or "exact." The suffix "–ite" means "the product of" and the root word "define" means to describe exactly. "Definition" and "purpose" are nouns and do not work since we are looking for an adjective. This means we can also get rid of "select" since that is a verb. "Minimal" means very little, which is not the correct definition.

30. E. "Exclusive" means limited, or "restricted," to a small group. The prefix "ex–" means "out" and the root word "cluse" means shut, while the suffix "–ive" means the quality of. The definition is then the quality of shutting things out. "Divide" and "concede" are both verbs and not the right choices since we are looking for an adjective. Both "moderate," which means average, and "challenging," which describes something that is hard, are not the best definition, leaving "restricted."

31. D. A blizzard is a more extreme version of a flurry of snow, so this is a <u>degree/intensity</u> analogy. Similarly, "skeletal" is a more extreme version of being thin. "Savior" and "saint" are synonyms, and there is no difference in their degree/intensity.

32. E. One narrates a tale, so this is a <u>noun/verb</u> analogy. Similarly, one competes in a race. "Emotion" and "feeling" are both nouns.

33. E. A stick is used to hit/catch a puck, so this is a <u>purpose/object</u> analogy. Similarly, a glove is used to catch a ball.

34. C. "Cheapest" is the superlative form of the adjective "cheap", so this is a <u>grammar</u> analogy. Similarly, "nearest" is the superlative form of "near". "Quiet" and "quietest" have a reversed order from the original structure.

35. E. To do something deliberately (or intentionally) means the opposite of unintentionally (the "un–" prefix negates the stem of "intentionally"), which means this is an <u>antonym</u> analogy. Similarly, to act gracefully is the opposite of acting clumsily. Though different, "ridiculously" and "solitarily" are not antonyms; you could behave ridiculously while you are solitary.

36. E. A handsaw is used to cut wood, so this is a <u>function/object</u> analogy. Similarly, a prank is used to dupe or trick someone. "Prejudice" and "segregation" have a cause/effect relationship rather than function/object.

37. A. Multiple people are in an audience, so this is a <u>part/whole</u> analogy. Similarly, a play contains multiple acts. While applause is formed of multiple claps, the order between part and whole are reversed.

38. E. "Prominent" shares the same meaning as notable, so this is a <u>synonym</u> analogy. Similarly, "disclose" means the same thing as "reveal". "Neural" means relating to the nervous system, and is not to be confused with "neurotic", so it does not share a meaning with "anxious".

39. E. "Miniscule" means "tiny", which is the opposite of "gigantic". As an <u>antonym</u> analogy, the best comparison would be to "succeed" and to "fumble" (or be clumsy).

40. D. A detective finds the culprit, so this is a <u>definition</u> analogy. Similarly, a dog finds the ball. Although a rooster could find a hen, 'finding' isn't associated as strongly with them as with dogs and balls.

41. A. A circus is shown in a tent, so this is a <u>purpose/object</u> analogy. A painting is shown in a frame. Though "sculpt" is a related word, "paintings" are not shown in "sculpts".

42. A. A dictionary is a type of book, so this is a <u>type/kind</u> analogy. Similarly, a mother is a type of kin (or relation). While a carrot is a type of vegetable, the order presented is reversed from the original structure.

43. B. A potter uses clay to create pottery, so this is a <u>individual/object</u> analogy. A janitor uses a mop to clean. While a librarian may use references in his/her work, 'referenced' is in the verb rather than noun form, so it is not referring to an object.

44. A. Learning can lead to wisdom, so this is a <u>cause/effect</u> analogy. Similarly, excessive heat can cause things to burn. Famine is caused by hunger rather than the other way around, so the order is reversed.

45. D. Crops are harvested, so this is a <u>noun/verb</u> analogy. Similarly, a conflict is resolved. While a religion is preached, in this case the presented order is reversed from the correct structure.

46. B. The ocean contains many droplets, which makes this a <u>part/whole</u> analogy. Similarly, a rock is a part of a mountain. While sediment may contain rocks, it has less connotations of a whole unit than a mountain.

47. C. Jesters were used to amuse people in medieval courts, so this is a <u>function/object</u> analogy. Similarly, a queen's function in court is to reign, or rule. The function of "rent" is not to "mortgage".

48. D. A sweater is a type of clothing, so this is a <u>type/kind</u> analogy. Similarly, a spoon is a type of cutlery. "Utensil" is a synonym rather than type of cutlery.

49. E. A waiter uses trays to delivery food, so this is a <u>individual/object</u> analogy. A writer uses a notebook to write down his/her ideas. While an owner's function is to supervise, "supervise" is a verb rather than noun.

50. E. "Often" has the same meaning as "frequently", so this is a <u>synonym</u> analogy. Similarly, a "horde" means the same thing as a "mob". "Ocular" means "relating to vision", but does not necessarily mean sight.

51. D. Infinite (or limitless) is the opposite of limited, marking this as an <u>antonym</u> analogy. The best antonym for "reluctant" would be "eager". "Hesitant" and "cautious" are both synonyms to "reluctant", not antonyms.

52. B. "Worse" is a comparative of "bad", so this is a <u>grammar</u> analogy. Similarly, "faster" is a comparative of "fast". "Easier" and "easy" are in the reversed order from the original structure.

53. E. A winner is congratulated, so this is a <u>noun/verb</u> relationship. The best noun to pair with "consider" would be "choice": a choice is considered. The other options are all adjectives.

54. A. Philosophers produce theories, so this is a <u>cause/effect</u> analogy. Similarly, when bombs go off, they produce damage to their surroundings. Echoes may cause the ear to hear something, but ear is not the consequence of an echo.

55. D. A net is used to catch fish, so this is a <u>purpose/object</u> analogy. Similarly, a paintbrush is used to paint pictures. Pride and honor may go together, but they are abstract concepts rather than tangible objects.

56. E. A gap is a less extreme version of an abyss, which is a deep hole in the earth. That means this is a <u>degree/intensity</u> analogy. Similarly, a cool temperature is a less extreme version of freezing temperatures. "Cavern" and "explorer" are two different things, rather than different descriptors of the same thing.

57. D. A house may contain several bedrooms, so this is a <u>part/whole</u> analogy. Similarly, a week contains 7 days. While an office may contain multiple charts, the other of part to whole is reversed.

58. E. An octagon is a type of shape, so this is a <u>type/kind</u> analogy. Similarly, bracelets are a type of jewelry. "Stop" may be a type of "sign", but the order is reversed from the original structure.

59. C. Journalists report the news, so this is a <u>definition</u> analogy. Similarly, a meteorologist reports the weather. A station does not report a channel, it plays a channel.

60. D. Teeth are used to chew, so this is a <u>function/object</u> analogy. Similarly, theater is used to entertain.

Section 4 – Quantitative

1. A. *Numbers – Fractions. Fractions.* In this problem, the key word "of" indicates multiplication. Use the expression $\frac{1}{4} \times \frac{1}{3}$ to find out how many cups of sugar Ramona uses. $\frac{1}{4} \times \frac{1}{3} = \frac{1 \times 1}{4 \times 3} = \frac{1}{12}$.

2. C. *Algebra – Interpreting Variables.* To find 11 more than three fourths x, add 11 to $\frac{3}{4}x$ which can be written as $\frac{3}{4}x + 11$.

3. D. *Pre–Algebra – Ratios & Proportions.* We know G:L:P = 3:6:2. So G + P : L = 5:6. If 25:L = 5:6, then L = 30.

4. A. *Pre–Algebra – Unit Analysis.* There are 60 minutes in an hour, and a half hour is equal to 30 minutes, so $1\frac{1}{2}$ hours is equal to 60 + 30 = 90 minutes. 90 – 75 = 15 minutes, so the difference is 15 minutes.

5. A. *Geometry – Transformations.* A reflection across the x-axis preserves the value of the x–coordinate and changes the sign of the y–coordinate. Since (–3, –4) is 4 units below the x-axis, it will be 4 units above the x–axis when reflected. The x–coordinate remains –3, while the y–coordinate becomes 4.

6. C. *Measurement – Time & Money.* $25 is divisible by $1.20 twenty times, with a remainder of $1. Because Christy cannot purchase a portion of a popsicle, the most she can buy is 20 popsicles.

7. D. *Numbers – Basic Computation.* 37 × 2,997 = 110,889. We could compute this product by multiplying 37 × 3,000 to get 111,000 and 37 × 3 to get 111 and then subtract 111,000 – 111 to obtain 110,889.

8. E. *Geometry – 2 & 3 Dimensional Shapes.* An equilateral triangle has three angles, all of which measure 60°. A right triangle (including a right-isosceles triangle) will have one angle which measures exactly 90°, and the remaining two angles will be complimentary, meaning that neither can surpass 90°. An acute triangle has no angles greater than 90°.

9. D. *Numbers – Percents.* There was no change between weeks 1 and 2 and there was a decrease between weeks 2 and 3. To find percent increase between the other weeks, plug the new and original values into the equation $\frac{new - original}{original}$. Weeks 3 and 4 had a $\frac{4-1}{1} = \frac{3}{1} = 3 = 300\%$ increase. Weeks 4 and 5 had a $\frac{6-4}{4} =$

$\frac{2}{4}$ = 0.5 = 50% increase, which is the desired answer. By contrast, weeks 5 and 6 had a $\frac{8-6}{6} = \frac{2}{3}$ =0.66... = $66\frac{2}{3}$% increase.

10. B. Measurement – Area, Perimeter & Volume. Imagine a 6m × 6m square cut out of an 8m × 8m square. The area of the shaded region is equal to the area of the large square *QRST* minus the area of the small square *LMNP* that's cut out of it. Since the side length of *QRST* = 8m, the area of *QRST* = (8m × 8m) = 64 m². Since the side length of *LMNP* = 6m, the area of *LMNP* = (6m × 6m) = 36 m². (64m² − 36m²) = 28 m².

11. C. *Pre–Algebra – Sequences, Patterns & Logic.* The 6th, 7th, and 8th terms will be $\frac{7}{13}, \frac{8}{15}$, and $\frac{9}{17}$. Because the denominator increases by two for every subsequent term, $\frac{x}{19}$ must be the 9th term. If the numerator of $\frac{9}{17}$ (the 8th term) increases by one to reach the 9th term, *x* must be 10.

12. D. *Data Analysis & Probability – Basic Probability.* On a number cube, there are two numbers higher than 4: 5 and 6. Using the formula: $P(\text{Event}) = \frac{\text{Number of ways Event can occur}}{\text{Total number of outcomes}}$, P(Higher than 4) $= \frac{2}{6} = \frac{1}{3}$.

13. C. *Pre–Algebra – Estimation. Numbers – Whole Numbers.* List the factor pairs of 75: 1 and 75; 3 and 25; 5 and 15.

14. D. *Pre–Algebra – Sequences, Patterns & Logic.* There are five terms in the series. Every term that is a multiple of five will be violet (the fifth term in the series). The multiple of five nearest to 54 is 55; the 54th term will be one term before violet, which is red.

15. C. *Geometry – Circles.* First, solve for *d* by plugging 64π for *C* into the formula *C* = π*d* to obtain 64π = π*d*. Divide both sides by π to solve for *d*: *d* = 64. If the diameter is 64, then the radius is 32 (half of 64).

16. E. *Algebra – Multi-Step Word Problems.* One hour is equal to 60 minutes. If Tyler's rate is constant, then (8 page every 5 minutes) = (96 pages every 60 minutes). Alternative solution: There are 60 ÷ 5 = 12 periods of 5 minutes in one hour. Multiply (8 pages × 12 periods) = 96 pages.

17. C. *Pre–Algebra – Ratios & Proportions.* Let *x* represent the number of camels that could subsist on 100 liters of water per week. We know that for every 25 liters of water, 7 camels could survive. So $\frac{7}{25} = \frac{x}{100}$. Cross–multiplication yields 700 = 25*x*, so *x* = 28.

18. E. *Numbers – Fractions.* In this problem, the key word "of" indicates multiplication. Use the expression 30 × $\frac{2}{5}$ to find out how many pencils Kori sharpened. 30 × $\frac{2}{5} = \frac{30}{1} \times \frac{2}{5} = \frac{30\times2}{1\times5} = \frac{60}{5}$ = 12. Therefore, she left 30 − 12 = 18 unsharpened.

19. C. *Algebra – Multi-Step Word Problems.* The number of students who require the textbook is 7 × 25 = 175. Therefore, 175 textbooks are needed. Since each box contains 15 textbooks, divide 175 textbooks by 15 textbooks per box. $\frac{175}{15}$ = 11 boxes, with a remainder of 10. 11 boxes and 10 additional books are needed to supply all the students with textbooks. Since it is not possible to order only 10 books, Principal Lopez needs another whole package. Therefore, 11 + 1 = 12 boxes must be ordered.

20. B. *Pre–Algebra – Estimation.* The artist's expenses can be rounded to $25 + $15 + $35 = $75. If the total sales are rounded to $125, then her profit can be estimated as $125 − $75 = $50.

21. C. *Numbers – Basic Computation.* 49 × 604 = 89,996. We could compute this product by multiplying 149 × 600 to get 89,400 and 149 × 4 to get 596 and then add 89,400 + 596 to obtain 89,996.

22. E. *Numbers – Fractions.* Converting each fraction into a decimal yields $\frac{1}{4}$ = 0.25; $\frac{3}{20}$ = 0.15; $\frac{1}{5}$ = 0.20; $\frac{2}{10}$ = 0.20; $\frac{2}{9}$ = 0.222...; and $\frac{1}{3}$ = 0.333.... Of these answer choices, only 0.333... is greater than 0.25.

23. A. *Algebra – Interpreting Variables.* The coefficients 12 and 6 have a greatest common factor of 6. Factoring out a 6 from both terms yields 6(2*x* + *y*).

24. B. *Numbers – Fractions.* 16 + 32 = 48, which means that 48 out of the 64 slices of pizza are either veggie or pepperoni. To find the number of slices that are neither veggie nor pepperoni, subtract 48 from 64: 48 − 64 = 16. 16 out of 64, or $\frac{16}{64}$, of the slices are not veggie or pepperoni; this fraction reduces to $\frac{1}{4}$.

25. C. *Algebra – Solving Equations and Inequalities*. Add 10 to both sides of the inequality: *K* < −7 + 10; *K* < 3. K must be less than 3 and cannot equal 3. The largest integer less than 3 is 2.

Section 5 – "Experimental"

1. B. *Tone/Mood/Style.* The essay is clearly making an argumentative claim: turmeric is just "a flavorful cooking spice" (line 16) and not a medicine. It is not a political speech because there are no clear references to government, politics, or laws. It is also not an encyclopedia entry, because the facts it provides about turmeric are not comprehensive, and instead focus on supporting the argument.

2. D. *Inference*. The claim is "people would do well to use [turmeric]" as a "flavorful cooking spice" (lines 15-16). The summary of possible health benefits is from an earlier paragraph, and there is no scientific evidence for turmeric being medically effective. While the earlier sentences do discredit turmeric's medical properties, lines 15-16 are stating an argument for what people should do with turmeric instead.

3. D. *Main Idea.* The last sentence (lines 15-16) establishes the main thesis of the overall essay, which is best captured by the headline "Turmeric: Food, Not Medicine." Although history is mentioned in the article, "A History of Turmeric" would not be an appropriate headline because the historical facts offered are just supporting details."Tumeric: A Flavorful Spice" is not a good fit since the article does not go into depth about the flavors or culinary uses of turmeric as a spice, despite brief mentions.

4. D. *Detail.* The essay mentions that some people believe turmeric is a potential replacement for pain pills (line 5), a cure for Alzheimer's (line 7), a beauty product and cream (lines 8-9), and an anti-depressant (line 7), but it is not listed as a digestive aid.

5. A. *Inference.* Since the author's overall claim is that turmeric is not an effective medicine, one can infer that in the context of "purported health and beauty benefits", "purported" would approximately mean untrue. The closest synonym to this would be supposed or alleged – claimed by some, but not necessarily true.

6. A. To "dissolve" means to break up into small pieces, or "disintegrate." Both "solution" and "sugar" are words that are commonly associated with "dissolve," but they do not reveal the definition and are nouns. We are looking for a verb, so "averse" also not the correct answer. "Faded," which is similar to disintegrate, but it is in the past tense, which makes "disintegrate" the better answer.

7. D. An "exclamation" is a sudden verbal expression, or "shout." When you "exclaim" something you are usually shouting or crying loudly. The suffix "-ation" means action, making the definition the action of saying something loudly. "Mark" may seem like a possible answer but remember not to be tricked by commonly associated words.

8. B. When you "feature" something you show it off, or "display" it. We are looking for a verb, so we can eliminate "personality," "eyes," and "news" since they are nouns (and the noun "feature" describes something found in a newspaper). "Praise," which means giving someone compliments, which is not the right definition.

9. D. "Interested" is a less extreme version of "enthusiastic", so this is a degree/intensity analogy. Similarly, "hungry" is the less extreme version of "ravenous", which means "starving". Although "furious" is the more extreme version of "angry", the order is reversed from the original structure. Calm and peaceful are synonyms, not more or less extreme versions of each other.

10. B. Being cold/freezing results in people sneezing, so this is a cause/effect analogy. Similarly, a hurricane results in flooding. A hurricane is caused by, rather than resulting in, climate change.

11. C. Many geese make up a flock, so this is a part/whole analogy. Similarly, many hours make up a day. Although many minutes make up an hour, the order is reversed from the original structure.

12. B. *Numbers – Decimals/Fractions/Percents.* $\frac{1}{87}$ is very small, so the answer choice can be eliminated. $\frac{4}{7}$ is close to 0.50 so the answer choice can also be eliminated. After converting $\frac{9}{10}$ to 0.90; $\frac{2}{3}$ = 0.66…; and $\frac{3}{4}$ to 0.75, we see that 0.90 is nearest 0.87.

13. B. *Algebra – Solving Equations and Inequalities*. Add v to both sides: $\frac{3}{8}$ > 1 + v. Subtract 1 from both sides: $\frac{3}{8} - 1 = \frac{3}{8} - \frac{8}{8} = -\frac{5}{8}$. Thus, $-\frac{5}{8}$ > v. Reverse the order of the inequality: $v < -\frac{5}{8}$.

14. D. *Geometry – Circles.* If the diameter is 11 cm, then the radius is 5.5 cm (half of 11 cm). Plugging r = 5.5 into the area formula, $A = \pi r^2$, would require us to compute A = 3.14 × 5.5² Rather than using a lot of time computing this product, let's estimate instead. Since 5.5 is between 5 and 6, then 5.5² is between 5² and 6². Let's estimate by using 30 for 5² and 3 for 3.14. Then the area is approximately 3 × 30 = 90. The only answer choice close to 90 is 94.988.

15. B. *Numbers – Decimals.* Do multiplication and division before subtraction. Multiply 0.3 by 0.6 to obtain 0.18, then subtract 0.18 from 0.2 by lining up the decimals properly. The result is 0.02.

16. B. *Measurement – Mean, Median & Mode.* To find the mean, find the sum of all numbers, then divide by the number of values. The mean is equal to $\frac{8+4+6+6+2+3+7+4}{8} = \frac{40}{8} = 5$.