


# Practice ISEE #6: Answer Explanations

*By Stephen Hayes and the Staff of General Academic*

*® ISEE is a registered trademark of the Educational Records Bureau, which does not endorse this book.*

 GENERAL ACADEMIC  
2427 Bartlett St., Houston, Texas 77098  
(800) 750 2060  
GeneralAcademic.com

© 2013 by General Academic, Inc. All rights reserved. This document may only be used and/ or reprinted for personal, non-commercial use. All other uses require the prior, written permission of General Academic.

## Verbal Reasoning - Synonyms

1. SUPERFLUOUS = more than necessary

A. formidable inspiring fear	B. postulated assume the truth of something for reasoning	C. tremendous very great in amount, scale, or intensity	D. unessential not absolutely necessary
---------------------------------	---	---	--

2. EMASCULATE = weaken somebody or something

A. bolster support or strengthen; prop up	B. harangue lecture someone in an aggressive manner	C. plaster a soft mixture of cement and water for spreading	D. undermine damage or weaken someone or something
---	---	---	--

3. PUERILE = regarded as childish silly or immature

A. agile quick or fast	B. immature childish in manner	C. maladroit ineffective or bungling; clumsy	D. sanitary of or relating to matters of health and hygiene
---------------------------	-----------------------------------	--	---

4. VIVIFY = to cause somebody or something to come to life

A. discern perceive or recognize something	B. enervate to feel drained of energy or vitality; weaken	C. malign evil in nature or effect; malevolent	D. vitalize to boost with energy, enthusiasm
--	---	--	--

5. SACCHARINE = excessively sentimental and cloying

A. acrimonious angry and bitter	B. granular consisting of small grains or particles	C. sentimental of or prompted by feelings of tenderness	D. supplemental functioning in a supporting capacity
------------------------------------	---	---	--

6. CONVIVIAL = friendly; enjoyable because of its friendliness

A. frail having a weak complexion or physique	B. hospitable friendly and welcoming to strangers or guests	C. intrusive causing an uninvited disturbance	D. pugnacious eager or quick to argue, quarrel, or fight
---	---	---	--

7. PROLETARIAT = the working class in a society

A. aristocracy the highest class in certain societies	B. bourgeois of or characteristic of the middle class	C. plebeian somebody from a lower working class	D. serfs a member of the lowest feudal class
---	---	---	--

8. SURFEIT = an excessive number or quantity of something

A. capitulation the action of ceasing to resist an opponent	B. dearth scarcity or lack of something	C. plethora a large or excessive amount of (something)	D. rout a disorderly retreat of defeated troops
---	---	--	---

9. ERUDITE = having or showing great knowledge gained from study and reading

A. eminent respected within a particular profession	B. erroneous wrong; incorrect	C. fallacious false; based on mistaken belief	D. scholarly possessing or showing a great deal of knowledge
---	----------------------------------	---	--

10. OBTUSE = slow to understand or perceive something

A. imperceptive lacking in sight or perception	B. jilted abandoned by a lover	C. protracted lasting for a long time or longer than expected	D. radiant sending out light; shining or glowing brightly
--	-----------------------------------	---	---

11. CORPULENT = somewhat overweight

- |                         |   |  |                                      |
|-------------------------|---|--|--------------------------------------|
| A. avaricious<br>greedy | B. fundamental<br>forming a necessary base<br>of central importance | C. militaristic<br>advocating an aggressive<br>military policy | D. rotund<br>plump, usually a person |
|-------------------------|---|--|--------------------------------------|

12. STYMIE = to prevent somebody or something from making further progress

- |  |  |  |   |
|--|--|--|---|
| A. blather<br>talk without making very<br>much sense | B. buttress<br>a projecting support of<br>stone built against a wall | C. hinder<br>create difficulties for<br>someone, causing delay | D. inject<br>to drive or force liquid<br>into a person's body |
|--|--|--|---|

13. ONEROUS = arduous

- |   |   |   |   |
|---|---|---|---|
| A. arduous<br>requiring strenuous<br>effort; difficult and tiring | B. defiant<br>open resistance; bold<br>disobedience | C. perfumed<br>naturally producing a<br>sweet, pleasant smell | D. singular<br>exceptionally good or<br>great; remarkable |
|---|---|---|---|

14. IMPISH = wicked in a playful way, without causing serious harm

- |                                  |                                       |  |  |
|----------------------------------|---------------------------------------|--|--|
| A. maniacal<br>wildly disordered | B. miniscule<br>extremely small; tiny | C. mischievous<br>a fondness for causing<br>trouble in a playful way | D. mystical<br>of or relating to mystics<br>or religious mysticism |
|----------------------------------|---------------------------------------|--|--|

15. RESCIND = to remove the validity or authority of something

- |   |                                   |   |   |
|---|-----------------------------------|---|---|
| A. enforce<br>compel observance of or<br>compliance with rule | B. extend<br>make longer or wider | C. instate<br>set up in position; install<br>or establish | D. retract<br>draw or be drawn back<br>or back in |
|---|-----------------------------------|---|---|

16. EMBLAZON = to decorate or adorn something such as clothing with bright colors or a symbol

- |   |  |                                   |   |
|---|--|-----------------------------------|---|
| A. deface<br>spoil the appearance of<br>(something) | B. embellish<br>make more attractive by<br>adding decorative details | C. kindle<br>light or set on fire | D. raze<br>completely destroy a<br>town or other site |
|---|--|-----------------------------------|---|

17. INDIGENOUS = originating in and naturally living, growing, or occurring in a region or country

- |  |   |   |   |
|--|---|---|---|
| A. aboriginal<br>to be native from an area | B. foreign<br>characteristic of a place<br>other than one's own | C. piqued<br>stimulate interest or<br>curiosity | D. resolved<br>firmly determined to do<br>something |
|--|---|---|---|

18. INGENUOUS = showing innocence and a lack of worldly experience

- |   |   |   |  |
|---|---|---|--|
| A. conniving<br>conspiring to do<br>something immoral | B. gullible<br>easily persuaded to<br>believe something | C. pretentious<br>acting as though more<br>important or special | D. zany<br>an erratic or eccentric<br>person |
|---|---|---|--|

19. TEMERITY = reckless confidence that might be offensive

- |  |   |   |                                  |
|--|---|---|----------------------------------|
| A. audacity<br>the willingness to take<br>bold risks | B. ignominy<br>public shame or disgrace | C. narcissism<br>excessive or erotic<br>interest in oneself | D. wobbliness<br>shaky or unsure |
|--|---|---|----------------------------------|

20. MELLIFLUOUS = pleasant and soothing to listen to, and sweet or rich in tone

- |  |  |  |   |
|--|--|--|---|
| A. cacophonous<br>producing a harsh<br>mixture of sounds | B. euphonious<br>having a pleasant sound | C. indispensable<br>absolutely necessary | D. mundane<br>lacking interest or<br>excitement; dull |
|--|--|--|---|

## Verbal Reasoning - Sentence Completions

21. After breaking the priceless vase, Mark attempted to walk nonchalantly out of the museum to avoid being identified as the culprit. C

*Explanation* The first part of the sentence says that Mark broke a very expensive vase which gives us a clue that he has done something bad. The second part of the sentence says that he wanted to get away without being noticed. Therefore the answer is C, nonchalantly, which means coolly and in an unconcerned manner.

22. Desiring to purchase a home without taking out a loan, Jackie requested a pay raise in order to accrue more wealth. A

*Explanation* In the first part of the sentence, before the comma, it says that Jackie is trying to purchase a home without a loan, hinting that he might need more money. In the second part, it says that Jackie wants a pay raise which means she will be collecting more money. As a result, accrue best describes her increase in wealth due to the pay raise.

23. Not content with simply defeating his enemies, Sam sought to obliterate them from existence. B

*Explanation* The first phrase describes someone who is not satisfied with simply defeating his enemies, which means that he or she wants to defeat them further. So, we are looking for an intensive word, and the word “obliterate” fits the intensity. The word “not” is an important word to show that Sam wanted to do more than simply defeat his opponent.

24. Shelma showed utter disdain for her fellow actors by skipping many rehearsals and complaining about their performances. B

*Explanation* Shelma has been skipping rehearsals and complaining about performances, and this shows that she does not care about her fellow actors. Her actions convey a negative connotation so the word we are looking for would also be negative. The words skipping and complaining show her disdain for performances and, therefore, her colleagues as well.

25. Traffic was moving at such a glacial pace that he knew he was going to miss his afternoon appointment. C

*Explanation* The words “traffic” and “miss” should be hints that the pace was slow. The second part of the sentence says that the person knew he was going to miss his appointment. So, we know that traffic would have caused him to move at a slow pace. The word that best fits with slow would be “glacial”.

26. She looked forward to moving to the vibrant community with its diverse social scenes and numerous amenities. D

*Explanation* The word “diverse” and the phrase “look forward” should have indicated that the missing word should be a positive one. The second part of the sentence describes the community as diverse and exciting which should indicate that the word we’re looking for should have a positive connotation. Only the word “vibrant” encapsulates that idea.

27. The professor was no longer exalted as the leading expert on chiropterans after he was exposed as a plagiarist. A

*Explanation* The phrase “no longer” shows a shift in the professor’s reputation from being a leading expert to being a plagiarist. So, because he is now labeled as a plagiarist, he is no longer exalted, or praised, for being a leading expert.

28. He was always a voluble child, spending hours describing every aspect of his environment to his parents. D

*Explanation* The second part of the sentence is crucial because it describes the meaning of the word. The second part of the sentence suggests that the child spends hours talking about his environment. Therefore, we look for a word that describes someone who likes talking, and the word “voluble” does that.

29. It is better to be a circumspect consumer instead of a reckless one, as impulsive purchases will often lead to regret and an empty wallet. B

*Explanation* The word “instead” is crucial because it suggests a shift from the first phrase. So, we need to look for the word that is the opposite of reckless and the best choice would be “circumspect,” which is someone who is cautious and not likely to take risks.

30. His canard refuted, the student was reprimanded for reporting that the teachers were aliens bent on world domination. A

*Explanation* The word “refuted” signals a shift in the sentence. The second part of the sentence suggests that whatever the student reported about the teachers was unfounded and outlandish. So, we would look for a word that means something close to rumor or a lie. Therefore, the answer is (A), canard.

31. After editing and reediting his term paper, Jim sat back and realized his edits made the paper so garbled that it was illegible. B

*Explanation* Because of the structure of the sentence, we want to find the answer choice with two words that are related to each other directly. After reediting his paper, Jim would have had many marks on his page, so we want to look for a word that means something along the lines of messy. Because his paper is marked up from all the edits, it would be difficult to read. So, for the second blank, we look for something along the lines of illegible.

32. Though the experimental filament is as thin as a single human hair but three times as resilient as steel, it dissolves in water. C

*Explanation* In the first blank, we look for a word that describes the long, thin hair-like substance, and “filament” describes that pretty well. In the second blank, we look for a word that describes the filament as being three times something as steel. “Though” indicates the second blank will be an improvement since the last part of the sentence states the filament dissolves in water (a not so good thing). So, in the second blank, we look for a word describing the filament as being three times as strong as steel, and resilient fits.

33. A diplomat must not have a pugnacious personality because it is conducive to building a peaceful relationship with foreign countries. C

*Explanation* In general, a diplomat would not want to have an aggressive personality because the goal of a diplomat is to be on good terms with other countries. So, in the first blank, we look for a word that describes this aggressive behavior. Only choices C and D do that. In the second blank, we look for a word that describes the importance of peaceful relationships among nations. Only choice D does that since “conducive” describes the positive or benefit of peace relations.

34. We rescued the timorous puppy from the shelter so that we could nurture it into the happy and intrepid dog it was meant to be. D

*Explanation* The keywords are rescued and nurture because they convey the idea that the dog had been in a worse condition than it is now. Given the structure of the sentence, we’re looking for two words that are the opposite of each other. Therefore, Choice D is right, since timorous means fearful and intrepid means fearless.

35. The tape is an impermanent solution; we need to buy some superglue so that the fix will be enduring. A

*Explanation* The two important words in this sentence are tape and superglue. Tape is known to be less effective than superglue, so the solution using the tape would not last as long as the superglue. As a result we look for the first word to mean impermanent and the second word to mean permanent. Choice A does that the best.

36. The officer castigated the driver for breaking the law and declared that any subsequent violations would result in greater penalties. A

*Explanation* The keywords here are “for breaking the law.” Breaking the law has a negative connotation, and if that person continues to break the law, it would most likely cause greater penalties. So, the first blank must be negative and the second blank must be a word that means something close to continue. Answer choice A is the best fit answer, since castigated means criticize and subsequent means successive occurrences.

37. The singer was confronted by a deluge of fans but managed to escape and find asylum in his tour bus. C

*Explanation* The keyword here is “escape.” A person would normally escape from something negative. Therefore, the first blank will be negatively describing the singer’s fans, and the second blank will be a place to escape to. Only answer choice C does this, since deluge means an overwhelming amount of something (flood) and asylum means a place of safety.

38. Patricia wanted to suffuse her garden’s soil with the proper nutrients, so she ordered a brand of fertilizer she knew to be exceptional. D

*Explanation* In order for the garden to grow properly, Patricia needs to spread the fertilizer evenly on her garden. She would also want to get a fertilizer that actually works. So, the first blank must be a word that describes spreading and the second blank must be a positive description of the fertilizer. Therefore, answer choice D is the best possible answer, since suffuse means spread over something and exceptional means outstanding or excellent.

39. The list of possible candidates was accidentally truncated when the printer malfunctioned on the last two pages.

D

*Explanation*

The keyword here is “accidentally.” This tells us that the two blanks are both negative since an accident has occurred. The printer must do something negative to the last two pages, such as jamming or not printing out the whole list. The word truncated means shortened by having a part cut off.

40. We will publish your book only if it is expurgated to be less controversial and more germane for a broader audience.

B

*Explanation*

“To be less controversial” must be a result of the first blank. The word expurgated means to remove words or passages considered offensive or controversial. The second blank will describe something that is suitable for a broader audience. The word germane means to be relevant and suitable for discussion.



## Quantitative Reasoning

1.  $y - 1$

D

*Tools:* order of operations

*Steps:* (1) Multiply both sides by  $x$  ( $y^2 - y = xy$ )

(2) Divide both sides by  $y$  ( $\frac{y^2 - y}{y} = x$ )

(3) Simplify ( $y - 1 = x$ )

*Quick Tips:* • Remember PEMDAS when doing these problems

2.  $N \div P$

A

*Tools:* number line

*Steps:* (1)  $N$  is a rational fraction between 0 and 1

(2)  $P$  is a rational fraction between 0 and 1

(3)  $P$  is greater than  $N$

(4) When you divide  $P$  by  $N$  you will get a positive number that will be greater than 1

(5) If you multiply the two, you will have a rational fraction between 0 and 1

(6) Therefore,  $N \div P$  is the greater value

*Quick Tips:* • If you are dividing by a fraction, you can also multiply by the reciprocal of the fraction

3.  $\{4, 7, 8, 13\}$

B

*Tools:* set notation

*Steps:* (1) The numbers that intersect ( $\cap$ ) both set  $V$  and  $X$  are  $\{7, 13\}$

(2) The numbers that are in both the set above and set  $W$  are  $\{2, 4, 6, 7, 8, 13\}$

(3) Finally, the numbers that intersect both the set above and set  $X$  are  $\{4, 7, 8, 13\}$

*Quick Tips:* • The symbol ( $\cap$ ) stands for the intersection of the values in the set. In other words, the similarities or what is shared in both sets

4.  $\frac{H}{2652}$

A

*Tools:* consecutive integers

*Steps:* (1)  $H$  will consist of multiplying  $1 \times 2 \times 3 \times \dots 51 \times 52$

(2) The product of consecutive whole numbers will be the same as  $H$ , except it will not multiply by 51 and 52

(3) So, we will have to divide  $51 \times 52$

(4)  $\frac{H}{51 \times 52} = \frac{H}{2652}$

*Quick Tips:* • Answer choice A is the only answer choice with  $H$  as a numerator, so you do not need to multiply out the denominator

5.  $8\pi - 8$ 

D

*Tools:* circles, triangles*Steps:* (1) Since the triangle is isosceles (45-45-90), we know that the base and the height of the triangle will be the same(2) The area of the triangle will be changed from  $\frac{1}{2}bh$  to  $\frac{1}{2}x^2$ (3) Set the new area formula equal to 8 ( $\frac{1}{2}x^2 = 8$ )(4) Solve for  $x$  (4)(5) Since the triangle is a 45-45-90 triangle, we know that the hypotenuse is  $4\sqrt{2}$ (6) Divide the hypotenuse by two in order to get the radius of the circle ( $2\sqrt{2}$ )(7) Plug the radius into the area formula of a circle ( $A = \pi(2\sqrt{2})^2 = 8\pi$ )(8) Subtract the area of the circle by the area of the triangle ( $8\pi - 8$ )*Quick Tips:* • If you forgot the ratio for a 45-45-90 triangle, you can always use Pythagorean theorem

6. 0.12

C

*Tools:* inequalities*Steps:* (1) The question tells us  $h$  will be a number between  $j$  and  $i$ (2)  $i$  represents the  $x$  value of the second point (0.68)(3)  $j$  represents the  $y$  value of the second point (0.055)

(4) The only answer choice between 0.68 and 0.055 is C (0.12)

*Quick Tips:* • Try writing out the values into the inequality to solve ( $7 > .68 > h > .055$ )

7. Dillon is not able to change the mean of the data

D

*Tools:* mean*Steps:* (1) The mean can be calculated by adding up the total percentages and divide them by 6 activities

(2) Since the total percentage must equal 100, and we are not adding a new activity, the mean cannot change

*Quick Tips:* • Always look at the unit of a chart or graph before trying to answer8.  $\frac{11}{25}$ 

B

*Tools:* exponents*Steps:* (1) Since the left hand side is in terms of 5, we need to have 625 in terms of 5

$$(625 = 5^4 \text{ or } 5^{-4} = \frac{1}{625})$$

(2) This tells us that  $d + e + f$  must equal  $-4$ (3) Since it does not matter which variable will be  $-2$ , we can assign  $d$  to have  $-2$  and the others to have  $-1$ (4) Plug in the values for the exponents ( $5^{-2} + 5^{-1} + 5^{-1}$ )(5) Simplify the exponents ( $\frac{1}{25} + \frac{1}{5} + \frac{1}{5}$ )(6) Add by getting the common denominator first ( $\frac{1}{25} + \frac{5}{25} + \frac{5}{25} = \frac{11}{25}$ )*Quick Tips:* • When an exponent is negative, you must take the reciprocal first ( $x^{-a} = \frac{1}{x^a}$ )

9. 25.9 inches C

*Tools:* proportions

*Steps:* (1) Set up the proportions with the neighbor's dog as the numerator ( $\frac{10}{7} = \frac{37}{x}$ )  
 (2) Cross multiply ( $10x = 259$ )  
 (3) Divide both sides by 10 ( $x = 25.9$ )

*Quick Tips:* • Make sure to keep both sides of the proportion similar. The neighbor's dog can be the denominator, but it must be the denominator on both sides

10. The wind's speed and whether the pigeon is flying against or with the wind C

*Tools:* rate problem

*Steps:* (1) Since the bird stays horizontal between the two poles, we would not need the heights of the poles  
 (2) However, the wind speed and direction will either increase or decrease the overall speed of the bird

*Quick Tips:* • Think of the wind as if it were a river with a current that either decreases or increases the rate of something

11.  $60^\circ$  C

*Tools:* transversal parallel lines

*Steps:* (1) The  $A^\circ$  is one angle in the small triangle below the two parallel lines  
 (2) The angle to the left of  $A^\circ$  is equal to  $60^\circ$  because it is an alternate exterior angle to  $60^\circ$   
 (3) The angle to the right of  $A^\circ$  is equal to  $60^\circ$  because it is a corresponding angle to  $120^\circ$   
 (4) Subtract these two angles from  $180^\circ$  in order to get  $A^\circ$  ( $180 - 60 - 60 = 60$ )

*Quick Tips:* • You should be able to recognize that the triangle is equilateral by step 3

12.  $\{0\}$  A

*Tools:* sets

*Steps:* (1) The only number in the two sets that intersect is zero  
 (2) Multiply zero by four  $\{0\}$

*Quick Tips:* •  $\cap$  stands for the intersection of the two sets (what is the same)  
 •  $\cup$  stands for the combination of both sets (no repeats)

13. 24 D

*Tools:* algebraic expression

*Steps:* (1) First, solve for  $h$  by dividing both sides by 7 ( $h^2 = 9$ )  
 (2) Take the square root of both sides ( $h = 3$ )  
 (3) Next, solve for  $j$  by dividing both sides by 21 ( $j = 3$ )  
 (4) Plug in the values for  $h$  and  $j$  ( $8\sqrt{(3)(3)}$ )  
 (5) Simplify (24)

*Quick Tips:* • Remember PEMDAS when doing these problems

14. 81

D

*Tools:* triangles, squares

- Steps:*
- (1) Split the hypotenuse in half, giving us the hypotenuse for the small triangle (
- $9\sqrt{2}$
- )
- 
- (2) The two triangles are 45-45-90 triangles because angle
- $O = 45^\circ$
- 
- (3) Find the side length of the 45-45-90 triangles with the ratio
- $x - x - x\sqrt{2}$
- (9)
- 
- (4) Plug the side length into the area formula of a triangle and multiply by two (
- $2 \times \frac{1}{2}(9)(9) = 81$
- )

- Quick Tips:*
- Every time you see
- $\sqrt{2}$
- as the length of the hypotenuse, the triangle will probably be a 45-45-90 triangle

15. 7

B

*Tools:* functions

- Steps:*
- (1) The denominator must not equal zero
- 
- (2) The only answer choice that makes the denominator zero is 7
- 
- (3)
- $6 \times 7 = 42$
- 
- (4)
- $42 - 42 = 0$

- Quick Tips:*
- If the denominator equals zero, you will get an undefined number

16. 0.01x

A

*Tools:* simple interest, compound interest

- Steps:*
- (1) For the simple interest multiply 10% to original amount (.1x)
- 
- (2) Now multiply it by 2 (.2x)
- 
- (3) Add this to the original amount of x (1.2x)
- 
- For the compound interest, plug in the information into the formula
- 
- (
- $A = x(1 + .1)^2 = x(1.1)^2 = 1.21x$
- )
- 
- (4) Subtract the compound interest by the simple interest (.01x)

- Quick Tips:*
- The simple interest formula is just multiplying the interest to the original amount every year

17. The shaded area of arc  $CMD$  is equal to the shaded area of arc  $AMB$ 

C

*Tools:* triangles, circles

- Steps:*
- (1) The two angles on either side of the midpoint are considered vertical angles and are also equal to each other
- 
- (2) Since the two angles that form the arc are equal, the area of the arc will also be equal

- Quick Tips:*
- The arc length and the area of the arc will always be proportional to the angle

18.  $Q = R - 3$ 

D

*Tools:* exponents

- Steps:*
- (1) 125 can also be written as
- $5^3$
- 
- (2) Multiply the two together (
- $5^3 \times 5^Q = 5^{3+Q}$
- )
- 
- (3) Since the base of the exponents are the same, set the two exponents equal to each other (
- $3 + Q = R$
- )
- 
- (4) Subtract 3 on both sides (
- $Q = R - 3$
- )

- Quick Tips:*
- You can only multiply or divide exponents if they have the same base

19.  $x > -2$  C
- Tools:* domain
- Steps:* (1) Set  $f(x)$  equal to zero, since it's the lowest value that's not positive ( $0 = x + 2$ )  
 (2) Subtract 2 on both sides ( $-2 = x$ )  
 (3) Anything greater than  $-2$  will make  $f(x)$  a positive number ( $x > -2$ )
- Quick Tips:* • Try plugging in numbers greater or less than  $-2$  and see which gives you a positive number

20. The two quantities are equal C
- Tools:* radicals, exponents
- Steps:* (1) Take the cube root of  $v^9$  ( $v^3$ )  
 (2) Add all of the exponents together in column B ( $v^0v^2v^1 = v^3$ )  
 (3)  $v^3 = v^3$
- Quick Tips:* • When you multiply two numbers with the same base, you will add the exponents

21. The number of ordered pairs that satisfy the equation  $\frac{1}{3} = \frac{u}{v}$  is the greater value A
- Tools:* fractions
- Steps:* (1)  $\frac{u}{v}$  can be any fraction that can be reduced back down to  $\frac{1}{3}$   
 (2) Since there are an infinite possibility of multiples, column A will be greater than 51
- Quick Tips:* •  $u$  and  $v$  can even be negative numbers, but only if both are negative

22. The relationship cannot be determined from the information given D
- Tools:* integers
- Steps:* (1) Any one of the segments can be a between 0 and 1  
 (2) If a fraction between 0 and 1 is cubed, it will end up smaller  
 (3) However, if a number that is greater than 1 and cubed, it will become larger  
 (4) Thus, the relationship cannot be determined from the information given
- Quick Tips:* • When dealing with exponent problems, always check to see if you can have a number between 0 and 1

23.  $\frac{22 \times 23 \times 24 \times 25}{11 \times 12 \times 4}$  is the greater value B
- Tools:* multiplication, division
- Steps:* (1) First divide the numbers in column A that divide into an integer  
 ( $\frac{28}{14} = 2, \frac{26}{13} = 2, \frac{27}{9} = 3$ )  
 (2) Multiply everything together ( $25 \times 2 \times 2 \times 3 = 300$ )  
 (3) Next divide the numbers in column B that divide into an integer  
 ( $\frac{22}{11} = 2, \frac{24}{12} = 2, \frac{24}{4} = 6$ )  
 (4) Multiply everything together ( $25 \times 2 \times 2 \times 6 = 600$ )  
 (5)  $600 > 300$
- Quick Tips:* • Always make it easier on yourself and look for a short cut since you will not have a calculator

24.  $(8 \times 2^3) + (2^4)^2 + 4(2^4)$  is the greater value A  
*Tools:* exponents  
*Steps:* (1) In column A, rewrite the 8 to  $2^3$   
 (2)  $(2^3 \times 2^3) + (2^4)^2 + 4(2^4) \rightarrow 2^6 + 2^8 + 2^2(2^4) \rightarrow 2^6 + 2^8 + 2^6$   
 (3)  $2^6 + 2^8 + 2^6 > 2^5 + 2^6 + 2^8$   
*Quick Tips:* • You do not need to actually add anything. You should easily see that  $2^6$  from column A is larger than the  $2^5$  from column B
- 
25. The area of circle  $O$  is the greater value A  
*Tools:* circles, sectors  
*Steps:* (1) Circle  $O$  contains sector  $AO$   
 (2) This tells us that circle  $O$  must be larger  
*Quick Tips:* • Do not over think a problem like this
- 
26. The two quantities are equal C  
*Tools:* system of linear functions  
*Steps:* (1) Solve for  $y$  in the second equation ( $y = 2 + x$ )  
 (2) Solve the system of linear equation by substituting the value of  $y$  from the second equation into the first equation ( $2x + 3(2 + x) = 16$ )  
 (3) Multiply 3 across the parenthesis ( $2x + 6 + 3x = 16$ )  
 (4) Combine like terms ( $5x = 10$ ) and then divide by 5 on both sides ( $x = 2$ )  
 (5) Plug the value for  $x$  into the second equation ( $y - (2) = 2$ )  
 (6) Solved for  $y$  by adding 2 on both sides ( $y = 4$ )  
 (7) Double the value of  $x$  ( $2x = 4$ )  
 (8)  $2x = y$   
*Quick Tips:* • Always plug in to the easier equation
- 
27. The relationship cannot be determined from the information given D  
*Tools:* probability  
*Steps:* (1) The probability of landing either heads or tails is 50%  
 (2) However, there is still a chance that we can get all head or all tails  
*Quick Tips:* • Probability is not definite  
 • If the question asked for the probability of either heads or tails, the answer values would be equal
- 
28. The two values are equal C  
*Tools:* triangles, rectangles  
*Steps:* (1) The only difference between the equation in column A and column B is that one is multiplying by  $FM$  and the other by  $GN$  (respectively)  
 (2) Since corner  $M$  and corner  $N$  are both right angles, we know that  $MFGN$  is a rectangle  
 (3) Since  $FM$  and  $GN$  are opposite sides of a rectangle, they will equal each other  
 (4) Since the only difference between the equations in column A and B actually equal each,  $\frac{(FG+EH)FM}{2} = \frac{GN(EH+FG)}{2}$   
*Quick Tips:* • Always look for the difference in two complicated equations

29. Cookies on the platter containing neither raisins nor figs is the greater value B

*Tools:* percentages

- Steps:*
- (1) For column A, add up the total number of cookies ( $8 + 8 + 10 + 4 + 6 = 36$ )
  - (2) Then add up all the cookies with chocolate ( $8 + 6 = 14$ )
  - (3) Divide the number of chocolate cookies by the total ( $\frac{14}{36} = .388 = 38.8\%$ )
  - (4) Add up the number of cookies with neither raisins nor figs ( $8 + 8 + 6 = 22$ )
  - (5) Divide that number by the total number of cookies ( $\frac{22}{36} = .611 = 61.1\%$ )
  - (6)  $61.1\% > 38.8\%$

*Quick Tips:* • To convert a decimal to a fraction, just move the decimal to the right two times

30. The relationship cannot be determined from the information given D

*Tools:* exponents, integers

- Steps:*
- (1) If we make  $n$  equal to 2, we will have both quantities equal to each other
  - (2) If we make  $n$  equal to 1, column A will equal to  $-1$  and column B will equal  $-3$
  - (3) Therefore, the relationship cannot be determined from the information given

*Quick Tips:* • Always try plugging in easy numbers like 1 and 2

31. The number of elements contained in  $(T \cap U) \cup V$  is the greater value A

*Tools:* set notation, intersection, union

- Steps:*
- (1)  $(T \cap U) = \{j, k, l, m\}$  and  $\{j, k, l, m\} \cup V = \{f, h, j, k, l, m, o, q\}$  or 8 elements
  - (2)  $(T \cup V) = \{f, g, h, j, k, l, m, o, q\}$  and  $\{f, g, h, j, k, l, m, o, q\} \cap U = \{j, k, l, m, o\}$  or 5 elements

*Quick Tips:* • PEMDAS must be followed for set notation questions as well

32.  $2 \blacklozenge (1 \blacklozenge 2)$  is the greater value B

*Tools:* functions

- Steps:*
- (1) For column A, plug in 2 in the place of  $a$  and 3 in the place of  $b$  ( $(2 + 3)^2$ )
  - (2) Simplify ( $(5)^2 = 25$ )
  - (3) For column B, first solve for the function that is inside of the parenthesis
  - (4) Plug 1 in for  $a$  and 2 in for  $b$  ( $(1 + 2)^2$ ) and Simplify (9)
  - (5) Now we have  $2 \blacklozenge (9)$  and we can plug the numbers back into the same function ( $(2 + 9)^2$ ) and Simplify (121)
  - (6)  $121 > 25$

*Quick Tips:* • You could have stopped at step 6. The value of 9 squared by itself will be larger than 5 squared

33. The two values are equal C

*Tools:* percent, fractions

- Steps:*
- (1) For column A, first take the twelve percent of 50 ( $.12 \times 50 = 6$ )
  - (2) Now take ten percent of 6 ( $.1 \times 6 = .6$ )
  - (3) Divide the fraction in column B ( $\frac{3}{5} = .6$ )
  - (4) The two values are equal

*Quick Tips:* • To convert a decimal to a fraction, just move the decimal to the right two times

34. The area of an isosceles right triangle with leg length  $a$  is the greater value B

*Tools:* triangles

- Steps:*
- (1) Use the 30-60-90 ratio to find the height of the equilateral triangle ( $\frac{a\sqrt{3}}{2}$ )
  - (2) Plug the height into the area formula of a triangle ( $\frac{1}{2}(a)\left(\frac{a\sqrt{3}}{2}\right) = \frac{\sqrt{3}}{2}a^2$ )
  - (3) Since the right triangle is isosceles, the two legs will equal  $a$
  - (4) Plug the height and base of the right triangle into the area formula ( $\frac{1}{2}(a)(a) = \frac{1}{2}a^2$ )
  - (5)  $\frac{1}{2}$  is greater than  $\frac{\sqrt{3}}{4}$ , so column B must be greater

- Quick Tips:*
- You can split an equilateral triangle in half and create two equal 30-60-90 triangles

35. Half the area of a circle with radius 6 is the greater value B

*Tools:* circles

- Steps:*
- (1) Find the area of the circle in column A ( $A = \pi r^2 = \pi(3)^2 = 9\pi$ )
  - (2) Find the area of the circle in column B ( $A = \pi r^2 = \pi(6)^2 = 36\pi$ )
  - (3) Divide the total area of the circle by two ( $18\pi$ )
  - (4)  $18\pi > 9\pi$

- Quick Tips:*
- If the question was asking for circumference instead, the values would be equal

36. The discount on a coat with an original price of \$120.00 is the greater value A

*Tools:* percent

- Steps:*
- (1) First calculate the discount on the coat by multiplying 120 by 15% ( $.15 \times 120 = 18$ )
  - (2) Now find the discount on the DVD by multiplying 20 by 15% ( $.15 \times 20 = 3$ )
  - (3) Subtract the original price of the DVD by the discount to get the sale price ( $20 - 3 = 17$ )
  - (4)  $18 > 17$

- Quick Tips:*
- To convert a decimal to a fraction, just move the decimal to the right two times

37. The relationship cannot be determined from the information given D

*Tools:* exponents

- Steps:*
- (1) The value of  $m$  and  $n$  can be any combination of positive integers that add to give us 6 ( $1 + 5$  or  $2 + 4$  or  $3 + 3$  or ...)
  - (2) If we try each possible combination, we will see that the relationship cannot be determined ( $1 \times 5 < 1 + 5$  and  $2 \times 4 > 2 + 4$ )

- Quick Tips:*
- You can only multiply or divide numbers with exponents if they have the same base



## Reading Comprehension - Passage 1

1. Savannah was the largest city in Georgia is the TRUE statement.

C

*Explanation*

Look to lines 5 to 6, "... was the largest city in Georgia until 1880, when Atlanta surpassed it in this regard." The question asks us which statement is true in 1870. Since it wasn't until 1880 that Atlanta became the largest city, Savannah must have been the largest in 1870.

2. 160 houses were included in the original configuration of Savannah.

D

*Explanation*

Look to lines 27 to 29, "On each corner of the Ward was a Tything, which contained ten housing lots..." Since we know that a Ward is in the shape of a square (line 24) and that his original design consisted of four Wards (line 34), we can calculate the exact number of possible houses. There are four Wards, and four corners to a Ward, and ten houses that can fit in a corner. By multiplying all these numbers together we get 160 houses. ( $4 \times 4 \times 10 = 160$ )

3. In line 8, "instrumental" most nearly means important.

C

*Explanation*

The word instrumental is defined as playing an important part in achieving a result or accomplishing a purpose. The passage is using this word to describe the General and the founding of the city. Therefore, this word must be a positive word that will fit into the context of the sentence. Important is the only possible answer choice.

4. We can infer from the passage that the relationship between the Savannah settlers and the Native Americans was initially friendly, but later hostile.

A

*Explanation*

Look to lines 63 to 65, "... the settlers were no longer content to let Native Americans reside peacefully nearby." The words "no longer" imply that the two were peaceful in the past.

5. The main purpose of this passage is to describe the founding of the city of Savannah.

B

*Explanation*

The first paragraph describes in detail how the city of Savannah was founded and designed. The passage then goes on to describe the different aspects of the city and how it changed early on. Thus, the main purpose of the passage is to describe the founding of the city.

6. According to the passage, the re-settlement of British debtors in Georgia was NEVER realized.

D

*Explanation*

The passage never talks about the British debtors and their re-settlement. However, the other three choices can all be found in the second paragraph.

## Reading Comprehension - Passage 2

7. According to the passage, a sleep disturbance probably indicates some kind of physical disease.

C

*Explanation* Look to lines 7 to 10, "... any disturbance which occurs in the enjoyment of this blessing, may be considered a decisive proof of some disease existing in the body." The blessing that the author is talking about is sleeping.

8. In line 37, "trifling" most nearly means not dangerous.

B

*Explanation* The word trifling is defined as insignificant, trivial, or of little value. In line 33, the author writes, "however, though frequently the forerunners of dangerous and fatal diseases, will yet often..." Because of the word "however," whatever the author writes next must describe the opposite of a dangerous disease.

9. Children are particularly susceptible to nightmares because their digestive systems are undeveloped.

A

*Explanation* Look to lines 42 to 45, "Children, whose digestive organs are peculiarly susceptible to illness, are also very frequently the subjects of frightful dreams." One reason why their digestive organs are susceptible to illness might be because they are undeveloped.

10. According to the passage, many people associate nightmares with fever.

D

*Explanation* Look to lines 17 to 22, "...people who are coming down with a fever or another disease... the patient has complained of disturbed rest and frightful dreams, with nightmares, etc." The author clearly states that nightmares are associated with a fever or disease.

11. Nightmares are more upsetting to adults than they are to children is a TRUE statement.

B

*Explanation* Look to lines 47 to 49, "They are still more so to grown-up people, as they generally arise from a more serious derangement of the system." The "they" in the sentence is referring to the distressing factor of the dream. The author is stating that, even though children have more nightmares, an adult will have more upsetting nightmares.

12. The best title for this passage is "Nightmares as Signals of Disease."

C

*Explanation* The passage does not mention the symbolism of the dreams, nor does it introduce any spiritual factors. The information on the diseases of the digestive system was a very small part of the passage. The passage uses the diseases of the digestive system as an example of how nightmares can detect them and other diseases.

## Reading Comprehension - Passage 3

13. We can infer from the final paragraph that the Caltech scientists are willing to change their mind if new evidence arises.

D

*Explanation*

The last paragraph starts off by saying, “scientists are quick to point out that there could be other explanations.” To be quick to point out differences means that the scientists do not have their minds set on just one explanation. The paragraph then states an example of how new evidence can change the scientists minds.

14. Most deltas observed on Mars are inside craters.

B

*Explanation*

Look to lines 48 to 51, “Deltas have been observed on Mars before, but most are inside a geological boundary like a crater.” The author clearly states that most of the deltas are in craters.

15. The style of the passage is expository.

A

*Explanation*

The passage intends to explain or describe how one can detect the existence of water on Mars. The passage also introduces other explanations in the last paragraph, showing the reader that the author does not have an opinion on the subject, which tells the reader that the passage is expository.

16. The stereo images taken by the MRO allowed scientists to conclude that the channels on Mars were not a drainage system down a mountain.

A

*Explanation*

Look to lines 40 to 42, “They determined that the water that once flowed through the channels was spreading out rather than converging.” In the previous paragraph, the author states that drainage system down a mountain will converge. Since the MRO determined that the water was spreading out, the drainage system could not come down a mountain.

17. In line 39, “resolution” most nearly means level of detail.

C

*Explanation*

The definition of resolution is the quality of detail of an image. The word is describing how the MRO can distinguish elevation change. The only way a camera can do this is if it can detect a high level of detail.

18. The purpose of the final paragraph is to indicate alternate explanations for the phenomena described earlier in the passage.

B

*Explanation*

At the end of the first sentence the author states that there are other explanations to the phenomena. He then goes on to give an example of the other potential explanations. Therefore, the purpose of the last paragraph is to give another explanation.

## Reading Comprehension - Passage 4

19. "...a woman...fiction." (lines 35-37) expresses the passage's main idea.

D

*Explanation*

In these lines, the author expresses the idea that one cannot come to a conclusion for the topic of women and fiction. The only thing you can discuss or come to a conclusion with is that a women only needs a room and money in order to write fiction.

20. We can infer that Fanny Burney, Miss Mitford, and Mrs. Gaskell write fiction.

D

*Explanation*

The question references the lines 7 to 14. The topic of the whole passage revolves around women and fiction. The author would not talk specifically about these women if they do not write fiction.

21. In lines 15-24, the author considers several approaches to the topic of women and fiction.

B

*Explanation*

The author seems to be stating the different ways of discussing the topic of women and fiction. She merely states a few different possible approaches and chooses the most complicated approach to further discuss.

22. It is the responsibility of a lecturer to provide some insight to the audience during a single lecture.

B

*Explanation*

Look to lines 29 to 31, "the first duty of a lecturer: to hand you after an hour's discourse a nugget of pure truth." The author does not think a lecturer should try and successfully give the audience one important piece of information rather than try to explain a broad topic poorly.

23. The tone of the passage is primarily conversational.

A

*Explanation*

Since the main question the author is trying to discuss is very vague, she can in no way answer it in one statement. She even goes on to explain that the topic cannot have a conclusion, no matter how much you study. Instead she tries to have a conversation about some problems with the vague topic, and provide an insight to the audience.

24. In line 27, the word "fatal" most nearly means significant.

D

*Explanation*

The definition of fatal is marking an important or decisive stage in a process or series of events. The author is trying to describe a drawback, which is later discussed as the major issue of the topic. This drawback must be important or significant.

## Reading Comprehension - Passage 5

25. The author is primarily interested in the reasons that people perceived Mozart as an “eternal child”. C

*Explanation* The first sentence of the passage brings up the conception of Mozart as an “eternal child.” The author later explains the history behind the myth and how it was propagated by his family.

26. By using the word “myth” (line 10), the author suggests that a popular perception may not be fully accurate. C

*Explanation* The word myth is defined as a widely held but mistaken belief. Therefore, the author feels that the “eternal child” story is false, even though many people believe it is true. He even later suggests that the father of Mozart started the myth for his own gain.

27. Audiences believed that Mozart had divine powers because his musical abilities were unusual for someone his age. D

*Explanation* Look to lines 11 to 13, “Mozart’s extraordinary musical abilities as a child prompted his audiences to see him as representing the divine...” The author then goes on to describe how this perception of Mozart was created by his father.

28. We can infer from lines 14-19 (“His father...profit”) that audiences in Mozart’s time were willing to pay to hear talented children perform. A

*Explanation* There would be no reason to promote a child prodigy if the audiences didn’t want to see them perform. The author even states that Mozart’s father used him to make a profit.

29. In line 26, “autonomous” most nearly means independent. C

*Explanation* The word autonomous is defined as something that is able to make decisions and act on them as a free and independent moral agent. The author states that Mozart’s father never let his son achieve independence and adulthood. Since his family wanted him to be an eternal child, they would oppose anything that would make Mozart independent or autonomous.

30. His biographers promoted the idea of the “child-myth.” A

*Explanation* Look to lines 33 to 40, “The child-myth remained in force during Mozart’s lifetime... due in large part to the accounts of his family members and biographers, who preferred to propagate that version of the composer’s life...” The author clearly states that the “eternal child” or “child-myth” grew bigger after Mozart’s death, especially due to the biographers.

## Reading Comprehension - Passage 6

31. This passage is most likely an excerpt from a fictional narrative.

B

*Explanation* The passage does not seem to have a poetic structure, nor does it state enough factual information for it to be non-fiction. Instead, the passage describes a hotel that seems to have a very imaginative description with fairy tale like guests.

32. The author mentions the views from the hotel in order to contrast with his earlier assertion that one could imagine the Trois Couronnes was an American hotel.

A

*Explanation* Look to lines 25 to 27, "...Vevey assumes at this period some of the characteristics of an American watering place." The sentence right after this line proceeds to describe the different sights and sounds that an American hotel could have. The author then states that the Trois Couronnes tends to receive these sights and sounds.

33. In line 25, "assumes" most nearly means takes on.

D

*Explanation* The definition of assumes is to adopt or take on a quality. The word is used in the sentence that compares the town of Vevey to an American watering hole. In order for the town to compare to America, it must take on, or assume, the characteristics.

34. The author mentions the "grand hotel" and the "Swiss *pension*" (lines 11-15) in order to illustrate the range of styles represented by Vevey's many hotels.

C

*Explanation* Look to lines 8 to 11, "The shore of the lake presents an unbroken array of establishments of this order, of every category..." The author mentions that the shore has every category of establishments. This tells us that the range of styles of hotels must be extensive.

35. The staff and clientele of the Trois Couronnes can best be described as international.

D

*Explanation* Look to lines 40 to 43, "...neat German waiters, who look like secretaries of legation; Russian princesses sitting in the garden; little Polish boys walking about..." In this sentence, the author is describing the different kind of people that stay and work at the hotel. Since the different people come from different places, they can be considered international.

36. We can infer from the passage that the economy of the town of Vevey depends on tourism.

D

*Explanation* The passage seems to describe only the hotels of the town. In lines 23 and 24, the author even mentions that "American travelers are extremely numerous." This tells us that the town of Vevey will most likely depend on tourism for their economy.

## Mathematics Achievement

1. 5

B

*Tools:* exponents, radicals

*Steps:* (1) Square both sides ( $5w = w^2$ )  
(2) Divide both sides by  $w$  ( $5 = w$ )

*Quick Tips:* • You can also try plugging in the answer choices, but that might take you longer to do

2.  $\frac{3x}{7m}$

B

*Tools:* fractions

*Steps:* (1) Multiply all of the numerators together ( $1 \times 4 \times 6 \times x \times 3 = 72x$ )  
(2) Multiply all of the denominators together ( $3 \times m \times 7 \times 2 \times 4 = 168m$ )  
(3) Simplify the denominator and numerator ( $\frac{72x}{168m} = \frac{3x}{7m}$ )

*Quick Tips:* • If you are having trouble reducing the fraction, try to first divide the numbers in half

3. 2 : 5

C

*Tools:* perimeter of triangle

*Steps:* (1) The perimeter of a triangle is just all of the sides added up  
(2) Since the triangle is equilateral, the sides will be equal  
(3) Since the sides are equal to each other, the ratio of the sides will have to be the same (2 : 5)

*Quick Tips:* • Pay attention the keywords of the question like equilateral and perimeter

4.  $x(g + 2n)$

C

*Tools:* Deciphering word problems

*Steps:* (1) Since the question only gives us the weight of an apple, we must write the formula in terms of the apple  
(2) In the terms of weight, two apples will equal one mango  
(3) So we must multiply the number of mangos ( $n$ ) by two  
(4) Add the number of apples and mangos (in terms of the weight of an apple) ( $g + 2n$ )  
(5) Multiply by the amount of ounces an apple has ( $x(g + 2n)$ )

*Quick Tips:* • You can also pick number for the weight and number of fruit and plug into the answer choices

5.  $\frac{\pi x}{3}$ 

B

*Tools:* arc length

- Steps:*
- (1) Find the circumference of the circle (
- $2\pi x$
- )
- 
- (2) Double the inscribed angle to find the center angle (60)
- 
- (3) Divide the center angle by the total degrees of a circle (
- $\frac{60}{360} = \frac{1}{6}$
- )
- 
- (4) Multiply the fraction to the circumference (
- $\frac{1}{6} \times 2\pi x = \frac{\pi x}{3}$
- )

*Quick Tips:* • The center angle will always be double the inscribed angle

6. 20 blocks

B

*Tools:* cubes

- Steps:*
- (1) Find the volume of one block (
- $3 \times 3 \times 3 = 27$
- )
- 
- (2) Divide the total volume of the rectangular cube by the volume of one block
- 
- (
- $\frac{540}{27} = 20$
- blocks)

*Quick Tips:* • The volume of a cube is just one side length to the third power (or cubed)

7. 18.2

B

*Tools:* sets

- Steps:*
- (1) Create a new set with all the different numbers in set
- $Q$
- and set
- $P$
- 
- {12, 13, 20, 22, 24}
- 
- (2) Add all of the numbers together (91)
- 
- (3) Divide the sum by the number of numbers (
- $\frac{91}{5} = 18.2$
- )

*Quick Tips:* • The symbol  $\cup$  stands for the union of the two sets

8. \$0

A

*Tools:* averages

- Steps:*
- (1) Find the average of the test (
- $\frac{96+82+89+95+94}{5} = 91.2$
- )
- 
- (2) Since Eloise did not get an average above a 92, she will not get any money

*Quick Tips:* • In order to calculate the average, just add all the tests up and divide by the number of tests

9. 36 minutes

C

*Tools:* work word problems

- Steps:*
- (1) Rufus' work time is 30 minutes and Ronald's is 20 minutes per elephant
- 
- (2) Use the work word problem formula to calculate the time it takes to wash one elephant together:
- $\frac{1}{30} + \frac{1}{20} = \frac{1}{t}$
- 
- (3)
- $\frac{1}{30} + \frac{1}{20} = \frac{1}{t} \rightarrow \frac{2}{60} + \frac{3}{60} = \frac{1}{t} \rightarrow \frac{5}{60} = \frac{1}{t} \rightarrow \frac{1}{12} = \frac{1}{t} \rightarrow t = 12$
- 
- (4) Multiply the value of
- $t$
- to the three elephants (36)

*Quick Tips:* • Work word problems rely on time, so pay attention to how quickly or how slowly workers complete the job



10. The union of set A and set B contains 13 elements

C

*Tools:* Venn diagram, sets

*Steps:* (1) The union of two sets will not use the same number twice from different sets  
 (2) The center area of the Venn diagram represents similar numbers  
 (3) Add up the numbers in circle A and Circle B and the center amount ( $5 + 2 + 6 = 13$ )

*Quick Tips:* • The intersection of sets are just the elements that are the same (the center of the Venn diagram)

11.  $5c + d = (c + d)^2$

C

*Tools:* exponents

*Steps:* (1) To find the sum add  $5c$  and  $d$  together ( $5c + d$ )  
 (2) Now square the sum of  $c$  and  $d$  ( $(c + d)^2$ )  
 (3) Finally, set the two equal to each other ( $5c + d = (c + d)^2$ )

*Quick Tips:* • Remember the order of operation (PEMDAS)

12. the graph with diagonal line positively crossing the  $y$ -axis

B

*Tools:* graphing, charts

*Steps:* (1) The first point on the chart is  $(-1, -1)$   
 (2) This tells us that a part of the line will have to be in the bottom left quadrant  
 (3) The next point on the chart is  $(0, 1)$   
 (4) This tells us that the line will cross the  $y$ -axis at a positive number of 1  
 (5) With these two points, the only possible answer is B

*Quick Tips:* • Try to find the trend of the chart before answering the question

13. 3

A

*Tools:* similar triangles

*Steps:* (1) Since the triangles are similar (same angles), we can set up our proportions for the side lengths  
 (2) We will set the length of  $BD$  equal to  $x$   
 (3) Add the two values of the left side of the larger triangle ( $6 + x$ ) and the right side ( $10 + 5 = 15$ )  
 (4) Set up the proportion with the small triangle values on top ( $\frac{6}{6+x} = \frac{10}{15}$ )  
 (5) Cross multiply ( $60 + 10x = 90$ )  
 (6) Subtract 60 on both sides ( $10x = 30$ ) and divide 10 on both sides ( $x = 10$ )

*Quick Tips:* • When doing proportions, always keep the same order

14. 120

B

*Tools:* combinations

*Steps:* (1) Order matters, so we must use the permutations formula ( $\frac{n!}{(n-r)!}$ )  
 (2) There are 6 elements in the set, so  $n$  is 6, and  $r$  is 3 ( $\frac{6!}{(6-3)!} \rightarrow \frac{6!}{3!}$ )  
 (3)  $\frac{6!}{3!} \rightarrow 6 \times 5 \times 4 = 120$

*Quick Tips:* • You can also use the formula  $n(n-1)(n-2)(n-r+1)$  to solve

15. 9 inches

B

*Tools:* ratios*Steps:* (1) Divide the 12 inches in the scale by 12 to convert the units to feet (1 inch:1 feet)

(2) So for every foot of the house, the model will equal an inch

(3) Since the ceiling equals 9 feet, the model of the ceiling will have to be 9 inches

*Quick Tips:* • You can also convert the 9 feet into inches and solve

16. 2

A

*Tools:* order of operations*Steps:* (1) First, plug in the value of  $m$  into the second equation and solve for  $n$ (2)  $3(4) + 2(4)^2 - 12 + n \rightarrow 12 + 32 - 12 + n \rightarrow 32 + n = 34 \rightarrow n = 2$ *Quick Tips:* • Remember the order of operation (PEMDAS)

17. I and III only

C

*Tools:* integers, inequalities*Steps:* (1) The only option for  $a$  is that it is positive(2) If we add a positive  $b$  to our positive  $a$ , we will get a value that is greater than  $a$ , not less(3) The only option is that we add a negative  $b$ , which will subtract from the positive  $a$  and give us a value that is less than  $a$ *Quick Tips:* • Since choice II and III are opposites, we can predict that one of them must be true

18. 3

C

*Tools:* consecutive integers*Steps:* (1) Calculate the number of integers in set  $A$  by subtracting the last number by the first number and add one ( $10 - 3 = 7 \rightarrow 7 + 1 = 8$ )(2) Calculate the number of even integers by subtracting the last number by the first number ( $40 - 20 = 20$ )

(3) We only want to find the even numbers, so we need to divide that by 2 (10)

(4) Since we started on an even number and ended on an even number, we need to add one (11)

(5) Subtract the two from each other ( $11 - 8 = 3$ )*Quick Tips:* • If you do not remember the formula, just write down the even number out and count them

19. 9

D

*Tools:* parallel lines*Steps:* (1) The definition of a parallel line is two lines on a plane that never meet. They are always the same distance apart(2) Since they will never meet, they cannot have the same  $y$ -intercept of 9*Quick Tips:* • If you are having trouble, try making a quick graph and test all the different answer choices

20.  $\frac{1}{36}$

A

*Tools:* probabilities

- Steps:*
- (1) The probability of first rolling a four is  $\frac{1}{6}$
  - (2) The probability of then rolling a three is  $\frac{1}{6}$
  - (3) Multiply both of these probabilities ( $\frac{1}{6} \times \frac{1}{6} = \frac{1}{36}$ )

- Quick Tips:*
- If you were to roll another cube, you would just keep multiplying the single probabilities together to find the total probability

21.  $\begin{bmatrix} 19 & 46 \\ 7 & 8 \end{bmatrix}$

C

*Tools:* matrices

- Steps:*
- (1) Multiply the top left of the first matrix with the top left of the second (12)
  - (2) Add this to the product of the top right of the first and the bottom left of the second ( $(7 \times 1) + 12 = 19$ )
  - (3) This will be the top left number of the new matrix and only one answer choice has 19 as the top left

- Quick Tips:*
- You can only multiply matrices when the number of columns in the first matrix is the same as the number of rows in the second matrix

22.  $\frac{a-b}{a+b+c}$

D

*Tools:* probability

- Steps:*
- (1) First, we add up all possible buttons ( $a + b + c$ )
  - (2) Next, we subtract  $a$  by  $b$  because the  $a > b$  ( $a - b$ )
  - (3) Set the difference over the total possible buttons ( $\frac{a-b}{a+b+c}$ )

- Quick Tips:*
- To find the probability of something, we always set the portion we want to choose over the total amount of options

23.  $16k$

A

*Tools:* arc length

- Steps:*
- (1) Multiply 100 piñatas by 4 dollars (400)
  - (2) Multiply 10 gorilla suits by 120 dollars (1200)
  - (3) Add these two together (1600)
  - (4) Change the  $k\%$  to a decimal ( $.0k$ )
  - (5) Multiply the total cost of 1600 by  $.0k$  ( $16k$ )

- Quick Tips:*
- To convert a percentage into a decimal, just move the decimal to the left twice

24. 5,040

B

*Tools:* combinations

- Steps:*
- (1) Since two places out of the 9 are taken by Schmegel and Corndog, we have 7 spots to fill out of 7 players
  - (2) Order matters, so we must use the permutations formula ( $\frac{n!}{(n-r)!}$ )

(4)  $\frac{7!}{(7-7)!} \rightarrow \frac{7!}{0!} \rightarrow 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 5,040$

- Quick Tips:*
- $0!$  equals 1

25. 7 ounces

A

*Tools:* deciphering word problems

- Steps:*
- (1) Multiply the 24 ounce bags by three (72)
- 
- (2) Since she distributed 1 and a half bags and there were three bags to start, we can divide the total ounces by 2 (36)
- 
- (3) Since Paula ate 6 ounces, we subtract by 6 (30)
- 
- (4) There are three people to split the remaining candy, so divide by 3 (10)

*Quick Tips:* • Do these questions step by step

26. 4 inches

C

*Tools:* triangular prisms

- Steps:*
- (1) Since the base is 5, the height of the base of the equilateral triangle is
- $2.5\sqrt{3}$
- 
- (2) Plug in
- $25\sqrt{3}$
- as the volume (
- $25\sqrt{3} = \frac{1}{2}(5)(2.5\sqrt{3})h \rightarrow 6.25\sqrt{3}h = 25\sqrt{3}$
- )
- 
- (3) Multiply by
- $\sqrt{3}$
- on both (
- $6.25h = 25$
- )
- 
- (4) Divide by 6.25 on both sides (
- $h = 4$
- )

*Quick Tips:* • The volume of a triangular prism is just the area of the base multiplied by the length27.  $x + 4y = 36$ 

B

*Tools:* linear functions

- Steps:*
- (1) Change answer choice B into the
- $y$
- intercept form
- 
- (
- $x + 4y = 36 \rightarrow 4y = -x + 36 \rightarrow y = -\frac{1}{4}x + 9$
- )
- 
- (2) Plug in 4 for
- $x$
- and 8 for
- $y$
- into the answer choice B
- 
- (3)
- $(8) = -\frac{1}{4}(4) + 9 \rightarrow 8 = -1 + 9 \rightarrow 8 = 8$
- 
- (4) Answer choice B has the correct slope and has the point (4, 8)

*Quick Tips:* • You must always find a matching slope and point for the line to be the same28.  $y = 7$ 

B

*Tools:* parallel lines

- Steps:*
- (1) The
- $x$
- axis has a slope of zero, so line
- $f$
- will also have a slope of zero
- 
- (2) If the line passes through
- $(-2, 7)$
- and is horizontal, there will only be one
- $y$
- value (7)
- 
- (3) The only answer with zero as the slope and
- $y$
- equaling 7 is B

*Quick Tips:* • Parallel lines will always have the same slope29. 1130.4  $\text{cm}^3$ 

B

*Tools:* cylinder

- Steps:*
- (1) Find the radius of the cylinder by dividing the diameter in half (6)
- 
- (2) Plug into the cylinder volume formula (
- $\pi r^2 h = \pi(6)^2 \times 20$
- )
- 
- (3) Simplify (2260.8) and divide in half (1130.4)

*Quick Tips:* • Pay attention to keywords like "half filled"  
• The volume of a cylinder is just the area of the base times the height

30. 5%

D

*Tools:* percent change

*Steps:* (1) Tommy's height in November is 40 and in February is 42

(2)  $P = \frac{|O-N|}{O} \rightarrow \frac{|40-42|}{40} \rightarrow \frac{2}{40} = .05$  or 5%

(3) Tommy's height changes by 5%

*Quick Tips:* • To convert a decimal to a fraction, just move the decimal to the right two times

31.  $\frac{1}{6}$

A

*Tools:* probability

*Steps:* (1) The probability of rolling a blue on the first cube is  $\frac{2}{6}$  or  $\frac{1}{3}$

(2) The probability of rolling a blue on the second cube is  $\frac{3}{6}$  or  $\frac{1}{2}$

(3) Multiply the two probabilities together ( $\frac{1}{3} \times \frac{1}{2} = \frac{1}{6}$ )

*Quick Tips:* • A cube or dice will always have 6 total sides

32. 3

B

*Tools:* squares, measurements

*Steps:* (1) Convert the 100 yard perimeter to feet ( $100 \times 3 = 300$ )

(2) Divide it by 4 to get the length of one side ( $\frac{300}{4} = 75$ )

(3) Divide the length of the one side by the distance the kangaroo jumps ( $\frac{75}{3} = 25$ )

*Quick Tips:* • There are 3 feet in one yard

33. 4

A

*Tools:* rectangle

*Steps:* (1) The perimeter of the mud pit is 26

(2) If we take four 8 foot fences, we will have a perimeter of 32

(3) Since the perimeter of the fence is larger than the mud pit, it will fully enclose the entire pit

*Quick Tips:* • To find the perimeter of the rectangle, just multiply each different side by 2 and add them together ( $(2 \times 5) + (2 \times 8) = 26$ )

34. The shop acquires two additional Labradoodles and one Golden Retriever

B

*Tools:* polynomials

*Steps:* (1) At the moment there are 4 Puggles

(2) If the amount of Puggles is to stay the same, we will need to add 3 more different dogs in order to get a total of 16 dogs ( $\frac{4}{16} = .25$  or 25%)

(3) Answer choice B is the only answer choice that adds three dogs that are not Puggles

*Quick Tips:* • Pay attention to the units of the graph

35. 5%

B

*Tools:* probability*Steps:* (1) The probability of getting one number right is  $\frac{1}{100}$ (2) If we had 5 chances to get one number right we will need to multiply 5 times the probability ( $\frac{1}{100} \times 5 = \frac{5}{100} = .05$  or 5%)*Quick Tips:* • To convert a percentage into a decimal, just move the decimal to the left twice36.  $\frac{m}{2}$ 

A

*Tools:* algebraic equation*Steps:* (1) First take the inverse of both sides so we can get  $x$  on top ( $\frac{1}{m} = \frac{x}{4}$ )(2) Now multiply both sides by 2 ( $\frac{2}{m} = \frac{x}{2}$ )*Quick Tips:* • Whatever you do on one side of the equation, you must do the same on the other side37.  $180^\circ - y^\circ$ 

B

*Tools:* transverse lines*Steps:* (1) A corresponding angle to  $m^\circ$  is just below angle  $y^\circ$ (2) The angle below  $y^\circ$  is supplementary with  $y^\circ$ (3) So, we can say the  $y^\circ + m^\circ = 180$ (4) If we subtract  $y^\circ$  on both sides we get answer choice B ( $180^\circ - y^\circ$ )*Quick Tips:* • Complementary angles add up to be 90 degrees  
• Supplementary angles add up to be 180 degrees38.  $n \geq 9$  or  $n \leq 5$ 

C

*Tools:* percentage*Steps:* (1) Since we are dealing with an absolute value inequality, we need to find the positive and negative values(2) For the positive, we just set  $n - 7 \geq 2$  and add 7 on both sides ( $n \geq 9$ )(3) Next, we set the inequality to be greater than  $-2$  instead of  $+2$  ( $n - 7 \geq -2$ )(4) Add 7 on both sides ( $n \geq 5$ )(5) Since we took the negative absolute value, we need to flip the sign of the inequality ( $n \leq 5$ )*Quick Tips:* • Try plugging in 6, 7, or 8 to see if the domain fits

39. 2

C

*Tools:* squares, triangles*Steps:* (1) The diagonal of a square equals to the hypotenuse of the 45-45-90 triangle(2) Since the side length of the square or triangle is 1 we can plug into the ratio of a 45-45-90 triangle to find the diagonal ( $1\sqrt{2}$ )(3) Now multiply the two diagonals together ( $\sqrt{2} \times \sqrt{2} = 2$ )*Quick Tips:* • The ratio for a 45 - 45 - 90 triangle is  $x - x - x\sqrt{2}$  (respectively)

40. 4

B

*Tools:* exponents

*Steps:* (1) Since the base of the exponents are the same, we can combine them  
 (2) First, multiply the  $(m^x)^y$  by multiplying the  $x$  and  $y$  ( $m^{xy}$ )  
 (3) Now add up all of the other exponents ( $m^{xy+x+y}$ )  
 (4) Plug in 3 for  $m$  and set it equal to 81 ( $3^{xy+x+y} = 81$ )  
 (5)  $3^{xy+x+y} = 81 \rightarrow 3^{xy+x+y} = 3^4 \rightarrow xy + x + y = 4$

*Quick Tips:* • You do not have to find the exact value of  $x$  and  $y$  to solve this question

41. (0,12)

A

*Tools:*  $y$ -intercept

*Steps:* (1) The  $y$ -intercept will always have an  $x$  value of 0  
 (2) Plug zero in for  $x$  ( $6(0)^2 - 5(0) + 12 = 12$ )  
 (3) The  $y$ -intercept is (0, 12)

*Quick Tips:* • Always look at the answer choices before doing any math. The only answer choice that has 0 for the  $x$  value is A  
 • The  $y$ -intercept always has zero for the  $x$  value

42. 30

C

*Tools:* deciphering word problems

*Steps:* (1) Six less than twelve equals to six ( $12 - 6 = 6$ )  
 (2)  $5 \times 6 = 30$

*Quick Tips:* • Watch out for keyword like “less than” or “product”

43. 43 minutes

B

*Tools:* rate problem

*Steps:* (1) Convert the 10 kilometers to meters (10,000 meters)  
 (2) Divide half the distance by 2.5 meters per second ( $\frac{5,000}{2.5} = 2000$  seconds)  
 (3) Convert the seconds to minutes ( $\frac{2000}{60} = 33.33$  minutes)  
 (4) Divide the second half of the trip by 30 kilometers per hour ( $\frac{5}{30} = .1666$ )  
 (5) Convert the hours to minutes (10 minutes)  
 (6) Add the minutes together ( $43.33 \approx 43$  minutes)

*Quick Tips:* • To convert from Kilometers to meters, just move the decimal to the right 3 times

44. (3, 4)

C

*Tools:* system of linear equations

*Steps:* (1) Plug the value of  $y$  of the second equation into the  $y$  of the first equation ( $2x + 3(7 - x) = 18$ )  
 (2)  $2x + 21 - 3x = 18 \rightarrow -1x + 21 = 18 \rightarrow -1x = -3 \rightarrow x = 3$   
 (3) Plug 3 for the  $x$  value of the second question ( $y = 7 - 3 = 4$ )  
 (4) The point is (3,4)

*Quick Tips:* • Remember the order of operation (PEMDAS)

45. 4.5

B

*Tools:* average*Steps:* (1) Subtract 3 from the total ( $12 - 3 = 9$ )(2) Divide the remaining chickens by the remaining people ( $\frac{9}{2} = 4.5$ )*Quick Tips:* • Don't over think the question

---

46.  $12\pi - 9\sqrt{3}$ 

C

*Tools:* triangles*Steps:* (1) Use the ratio of a 30-60-90 triangle to find the height ( $x - x\sqrt{3} - 2x$ )(2) Since half of the base is 3, we know that the height is  $3\sqrt{3}$ (3) Find the area of the triangle ( $\frac{1}{2}(6)(3\sqrt{3}) = 3(3\sqrt{3}) = 9\sqrt{3}$ )(4) Subtract the area of the circle by the area of the triangle ( $12\pi - 9\sqrt{3}$ )*Quick Tips:* • Equilateral triangles will always form two equal 30 – 60 – 90 triangles

---

47. cash, toaster, vacation

C

*Tools:* probabilities*Steps:* (1) The probability of landing on cash is  $\frac{2}{8}$ (2) The probability of landing on toaster is also  $\frac{2}{8}$ (3) The probability of landing on vacation is  $\frac{1}{8}$ (4) Multiply the probabilities together ( $\frac{2}{8} \times \frac{2}{8} \times \frac{1}{8} = \frac{1}{128}$ )*Quick Tips:* • There is only one "vacation" segment on the wheel. This tells us any answer choice with "vacation" should have the least probability of occurring



## Essay

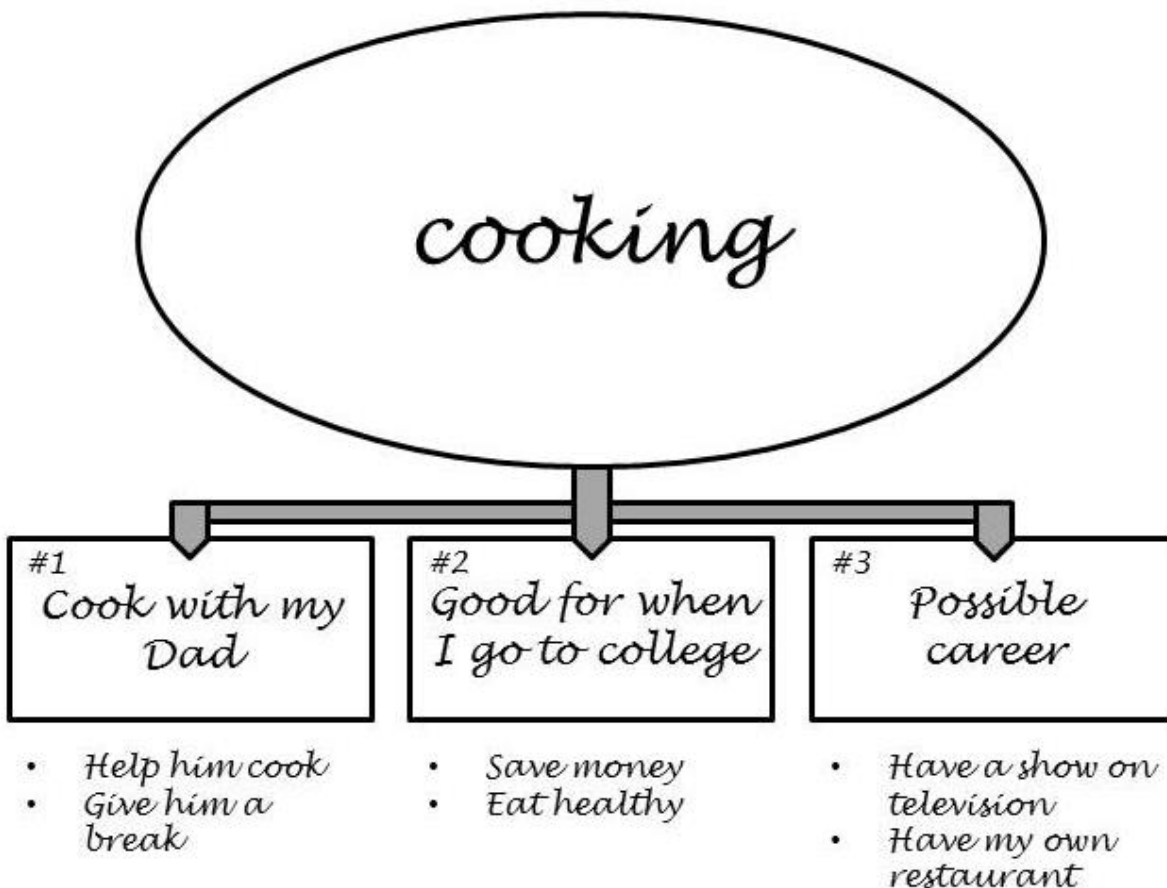
**If you could gain one new skill, what would it be and why?**

### *Brainstorming*

The prompt is asking you about something you may want to learn. It is something that may be exciting and interesting to you, but you haven't learned yet. You could talk about a sport that you want to learn, or even a musical instrument. As long as it interests you. For example:

- learn how to play soccer
- learn how to play basketball
- learn how to cook
- be better at math
- learn magic
- learn how to play the drums

### Outline



## Section 5 – Essay (EXAMPLE)

30 Minutes

Please write your essay prompt here.

If you could gain one new skill, what would it be and why?

There are so many different skills that I want to learn, but only one stands out at the moment. Most people want to learn how to play a new sport, maybe a new instrument, but I would rather learn how to cook. I have always enjoyed food, and I feel it is time for me to learn how to make it. If I learn the skill of cooking, then I can help my dad with dinner, I can take my skills with me to college, and maybe I can even start a career with it.

The main reason why I want to learn this new skill is to be able to cook with my dad. For as long as I can remember, my dad has been the main cook at my house. Every night he makes an amazing meal with fresh and healthy ingredients. He even takes time out of his busy schedule to pack a homemade lunch with organic apples and peanut butter. I want to be able to come home from school and help my dad cook dinner. This way, he does not have to feel so stressed when he comes home from work. I can start prepping the necessary ingredients and my dad can take over when he gets back from work. Maybe one day my dad can sit back and relax while I cook to whole meal.

Learning to cook is also a skill that I can take with me when I finally get to go to college. I can't imagine how I would feel, or even study, if I just ate chicken noodles all the time. I would rather learn how to make chicken broth with organic vegetables than eat a microwaved dish out of a cup. Having a healthy diet will give me the proper energy to succeed in college. I learned in my health class that the body needs a good balance of healthy fats, vitamins, proteins, and carbs. The processed food that most college students eat contain a great deal of carbs and bad fats with very little to no vitamins. Plus, cooking my own meals will save me a ton of money.

Cooking could also make me some money. One day, if I get really good and creative with my culinary skills, I could possibly make a career out of it. I could have my own

restaurant that serves healthy and delicious food. I can take what my dad teaches me and use it at my restaurant. Maybe I would even get a chance to have my own cooking show, teaching kids the joy of cooking. It is important to show other kids the significance of eating healthy food, so they are not stuffing their faces with processed junk food. This way, they could pass on what they learn to their brothers and sisters, or even to their own kids in the future.

Learning to cook is a very important skill that I would love to learn, and is a skill that most people my age would not consider important to learn. It might bring my father and I closer together and give him the break he deserves. I could even take this skill with me to college and show my brother how nutrition can help you study. This skill could end up being a possible career, owning my own restaurant. I could even have my own cooking show. In the end, learning the skill to cook would better my father's life, help with my studies, and even give me opportunities to better life and the lives of others.