

There is no information to determine which possibility is correct. Check the options one by one. Options F, G, H, and K are true for one possibility but not the other, so you cannot conclude that any of them **must** be true. Option J is always true—Larnell and Sara wear school T-shirts in both possibilities.

## Reading

### Flavors

**21. (C)** The answer to the first question for each passage must be broad enough to encompass the main points, but not overly broad. Options A and B are too broad—the passage mentions some scientific aspects of taste and smell, but it concentrates on the development of synthetic flavors. Option C is a good summary of the passage. It successfully incorporates the main topics—the science of taste and smell, the duplication of many flavors, and the implications of synthetic flavors. Option D is mentioned only in the last paragraph. Option E is not mentioned at all.

**22. (J)** The third paragraph describes a technique for separating a food into its basic chemical constituents. Option J best summarizes the goal of this research. Options F, H, and K are not mentioned. Option G is incorrect because the researchers are developing artificial flavors, not artificial foods.

**23. (B)** Lines 65-67 state that some flavors, including strawberry, are nearly impossible to duplicate. The passage then goes on to say that chocolate flavor cannot be duplicated because of its complexity. It is reasonable to infer that strawberry, like chocolate, is also more complex than other natural flavors. Option B restates this inference. Option A may be true, but does not explain why no good artificial strawberry flavoring exists. Option C is unlikely, given that the use of a gas chromatograph to duplicate flavors seems to be a standard procedure. The passage does not support Option D. Option E is contradicted by lines 20-22.

**24. (H)** The process of collecting aromas during food preparation is described in the third paragraph. For this kind of question, be sure to read every option to identify the option best supported by the passage. Option F is ruled out; odorless foods by definition do not have aromas. Options G and J might or might not be true, but the information in the passage does not support them one way or the other. Option K cannot be concluded from the process as described in the passage. Option H is best. The odor of food as it is being prepared can be captured and distilled to synthesize the food's flavor.

**25. (D)** Orange soda is mentioned in lines 54-58, following a statement that some American consumers prefer synthetic flavors to natural flavors. Orange soda is mentioned as an example of this assertion, which is Option D. Orange is a natural flavor, ruling out Option A, and it has been successfully reproduced (lines 20-22), ruling out Option B. Orange soda is mentioned to compare natural and artificial flavors, not to describe how orange flavor is reproduced, eliminating Option C. The passage does not support Option E.

**26. (K)** Some flavorists are concerned (“worry”) that natural flavorings will become scarce because many consumers prefer synthetic flavors (lines 58-62). Option K expresses this concern. Artificial flavors are less expensive to produce than natural flavors (lines 60-62), contradicting Option F. Options G and H are not mentioned. The passage does not mention how flavorists view the use of artificial flavors in other products, which rules out Option J.

### Bats

**27. (B)** Option A cannot be correct because the passage discusses animal species, not plants, that are becoming endangered. Option C is an important detail, but it is not the theme of the passage. Option D is contradicted by lines 4-7. Option E is also important, but the passage is about much more than the pollination of tropical plants. Option B is best. It incorporates the notion of bat stereotypes contrasted with the advantages that bats provide to plants and animals, including humans.

**28. (H)** “Ugliness is only skin deep” (line 70) is a play on the expression “Beauty is only skin deep,” which means that an attractive outward appearance does not necessarily indicate inward beauty. The intended meaning—that an ugly outward appearance does not always imply evil or harmfulness—is Option H. None of the other options correctly apply to this “new twist to an old adage.”

**29. (D)** The far-reaching impact of a keystone species is described in the third paragraph. The flying fox, a keystone in the rain forest, pollinates and distributes seeds, and thus helps provide food and shelter for many other plants and animals in its ecosystem. Rain forests in turn help to maintain a balanced global atmosphere for living creatures everywhere. Option D best summarizes the far-reaching impact of a keystone species. None of the other options are supported by the passage.

**30. (J)** The question asks for the most immediate result that would occur before other, more distant consequences took place. Read every option before deciding which describes the most immediate result. Options F and H are possible, but they are long-term, not immediate, results. Options G and K are not supported by the passage. Option J is the only immediate result.

**31. (C)** The passage discusses bats' consumption of cultivated fruit in lines 46-50. Bats in the wild feed on wild (uncultivated) fruit; they eat cultivated fruit only when wild fruit cannot be found due to reduced habitat for wild fruit trees, which is Option C. Option A is contradicted by the passage. Options B, D, and E are not supported.

**32. (F)** The iroko tree is mentioned in lines 20-23 as a valuable tree that depends entirely on flying foxes for pollination. The previous sentence stated the importance of flying foxes for pollination of plants such as avocados and date trees. Both sentences are about the importance of flying foxes for the pollination of useful plants, which is Option F. Option G is not mentioned. Options H, J, and K do not explain why the author mentioned the iroko tree.

### Dickens

**33. (D)** Options A, C, and E are important details, but they are not the main themes. Option D correctly combines the information in the passage about Dickens' childhood and the novel *David Copperfield*. Option B might look appealing because it also contains the ideas of Dickens' childhood and an autobiography, but his autobiography was never written, either in childhood or in adulthood.

**34. (F)** Dickens began writing *David Copperfield* after abandoning work on his own life story, or autobiography (lines 6-8), which is Option F. He wrote the book well into adulthood, ruling out Options G and H. The events in Options J and K never occurred.

**35. (E)** Dickens' childhood is described in the second and third paragraphs. Read each option to determine whether it is a reasonable inference, based on the information in the passage. Option E is a reasonable inference, based on line 17 (Dickens was "forced to quit school") and lines 26-27 (he was miserable at his job). Options A, B, C, and D are not supported by the passage.

**36. (G)** The correct answer is found in lines 10-13 and in the fourth paragraph. Dickens wrote *David Copperfield* because he was unable to complete his autobiography, and writing the novel helped him deal with painful childhood memories. Option G is the best summary. Dickens' father had debts, not Charles Dickens himself, ruling out Option F. Options H and K are contradicted by the passage. Dickens never wrote his autobiography, eliminating Option J.

**37. (C)** The passage says little about the relationship between Dickens and his mother, only that Charles felt betrayed when his mother, anxious for the boy's wages, got his job back for him (lines 33-36). Option C best expresses this information. Options B and E are contradicted by the passage. The passage does not address the issues presented in Options A and D.

**38. (K)** The passage states, "The father, however, now sided with his son and the boy was sent back to school" (lines 37-38). In other words, Charles was able to return to school because of his father's intervention (Option K). Options F and J were obstacles, not aids, to his returning to school. Option G led to dismissal from his job, not to his return to school. Option H occurred before Dickens returned to school, but was not the direct reason for it.

### Wind Energy

**39. (B)** Option A is mentioned only in the first paragraph, and it is not the main theme. Option B best summarizes the passage: it describes how wind energy has been used, from ancient sailboats through medieval windmills to modern turbines. Option C is not mentioned. Options D and E are important points, but neither is the main theme.

**40. (F)** The first known windmills originated in Persia (lines 15-17), which is Option F.

**41. (D)** The future use of wind energy is discussed in the last paragraph. Reread the paragraph to determine the author's opinion. Options A, C, and E are never mentioned. Option D best conveys the author's optimism that wind farms—"efficient, clean, and fairly inexpensive to operate" (lines 70-71)—will be a major source of electricity in the future. Option B is contradicted by the information in the passage.

**42. (K)** In the passage, the author followed the history of wind energy from old-fashioned water-pumping windmills (lines 17-19) to thin-bladed windmills that provided electricity (lines 55-58) to the development of wind farms in the last several decades (lines 67-70). You are asked which option best illustrates the development of wind energy. Options F, G, and J are contradicted by the passage. Option H is mentioned as only one example in the history of wind energy. Option K, which states that the development from simpler into more complex machines illustrates human creativity, is the best answer.

**43. (D)** The need for windmills to produce electricity on American farms before the 1950s is discussed in lines 53-58. The next two sentences explain that the need for windmills decreased in the 1950s because most homes were connected to an electric utility and no longer depended on windmills for electrical power (Option D). Options A and C are contradicted by the passage. Option B incorrectly combines information in the passage, and Option E overlooks the fact that wind turbines are windmills, and thus did not replace windmills.

**44. (G)** The country of Holland (lines 32-36) used windmills to pump seawater away from bogs and reclaim large areas of land (Option G). Dutch shipbuilding is not mentioned, ruling out Option F. Although Holland was famous for its windmills, there is no reason to conclude that the windmills are what made the country famous, eliminating Option H. Options J and K are contradicted by the passage.

## Smiles

**45. (A)** Options B and D are mentioned but they are important details, not the main theme. Option C is too broad. The passage is about testing only one theory on the relationship between emotions and facial expressions, not about the use of facial expressions in any type of research. Option A is best. It is broad enough to encompass Darwin's theories and more modern theories, and it correctly identifies the issue, the causation of emotions. Option E is a detail mentioned only in the last paragraph.

**46. (K)** After volunteers said the required words, researchers assessed how happy the volunteers felt, which is Option K. Option F is related to the researchers' theory, but it was never carried out. Option G is ruled out because volunteers who smiled were not in the group that said words like "few" (lines 25-28). Option H is contradicted by lines 23-24. The volunteers, not the researchers, placed their facial muscles into smiles or frowns (lines 21-23), eliminating Option J.

**47. (A)** In the first paragraph, Darwin's theory is described as controversial and impossible to prove, and it thus never gained acceptance (lines 10-12). Option A best summarizes this idea. Options B and D are contradicted by the passage. Options C and E may or may not be true, but they do not explain why Darwin's theory was not accepted during his lifetime.

**48. (H)** Volunteers who said words such as "cheese" were measurably happier than volunteers who said other words (lines 25-28), implying that the act of smiling leads to volunteers feeling happier. According to the theory in lines 33-36, a smile lowers the temperature of the blood flowing to the hypothalamus (lines 44-47), which is Option H. Options F, J, and K are contradicted by the passage. Option G is not mentioned.

**49. (A)** All five options are true statements as they stand. You are asked to choose the option that best describes the notion in line 19. A smile in one's heart (lines 19-20) signifies a feeling of happiness. Thus consciously smiling can produce feelings of happiness, which is Option A. None of the other options correspond to this "notion."

**50. (G)** The passage describes the hypothalamus as an area of the brain believed to regulate emotions (lines 40-41). Regulating and managing emotions are the same process, and thus Option G is the best answer. None of the other options is supported by the passage. Option H may seem attractive, but the passage theorizes that the act of smiling, not the hypothalamus, changes the temperature of blood.

51. (E)  $8 \times 3\frac{1}{4} = 8 \times \frac{13}{4} = 26$

52. (K)  $100(2 + 0.1)^2 - 100$   
 $= 100(2.1)^2 - 100$   
 $= 100(4.41) - 100$   
 $= 441 - 100$   
 $= 341$

53. (E) First, find the ratio of red to green to blue pencils:  
 $480:240:160 = 6:3:2$   
 Since  $6 + 3 + 2 = 11$ , multiply each value by 2 (because  $2 \times 11 = 22$ ) to get the number of each color pencil in a set of 22 randomly chosen pencils:  
 12 red, 6 green, 4 blue

54. (H) First, use the given information to calculate the value of  $b$ :

$$\frac{a}{b} = 2$$

$$\frac{8}{b} = 2$$

$$8 = 2b$$

$$4 = b$$

Now, calculate  $3b + a^2$  by substituting  $a = 8$  and  $b = 4$ :

$$3(4) + (8)^2 = 12 + 64 = 76$$

55. (D) Multiply the numerator and denominator by 100 to eliminate the decimals:

$$3.99 \div 1.5 =$$

$$\left(\frac{3.99}{1.5}\right)\left(\frac{100}{100}\right) = \frac{399}{150} = \frac{133}{50} = \frac{266}{100} = 2.66$$

Note: You could also solve this equation using long-division.

56. (J) The quickest solution is to first “round up” from 46 hours to 48 hours, because 48 hours is 2 full days. Thus, 48 hours after 9:30 p.m. on Friday would be 9:30 p.m. on Sunday. Since the question asks for 46 hours, subtract 2 hours from 9:30 p.m. Sunday to get 7:30 p.m. Sunday.

57. (A) First, simplify the inequality:

$$x + 7 < 23$$

$$x < 16$$

The positive integers that satisfy the inequality are 1, 2, 3, ..., 14, 15. (We cannot include 16 because  $x$  must be **less than** 16.) 15 positive integers satisfy this inequality.

58. (J) The area of triangle MPR is equal to half the area of rectangle MNQP. So, the area of MPR is also equal to the area of triangles MNP + RPQ. Point P is the midpoint of side  $\overline{NQ}$ , so triangle MNP is equal in area to triangle RQP. Thus, triangle MPR = 2(RQP). The area of the unshaded region is the sum of the areas of triangles MPR and MNP.

$$MNP = RQP = 24 \text{ sq cm}$$

$$MPQ = 2(RQP) = 48 \text{ sq cm}$$

Thus, the area of the unshaded region is  $24 + 48 = 72$  sq cm

59. (A) The cost for one child’s supplies is:

$$\$1.09 + 2(\$0.59) = \$2.27$$

Divide the total money available (\$15) by the cost for one child’s supplies (\$2.27) to get the number of children that can be provided with the supplies:

$$\$15 \div \$2.27 = 6.6\dots$$

You do not need to complete the division, because the number of children must be a whole number. Six children can be provided with the complete requirement of supplies.

60. (G) Write 0.75 as a fraction in lowest terms to find the least value of  $x$ :

$$0.75 = \frac{75}{100} = \frac{3}{4}$$

So, the least possible positive integer value of  $x = 3$

61. (C) To find the average, multiply each number of songs by the number of radio stations. Then add those products and divide by the total number of radio stations:

$$\frac{(14 \cdot 8) + (15 \cdot 4) + (16 \cdot 4) + (17 \cdot 5) + (18 \cdot 9)}{30}$$

$$= \frac{112 + 60 + 64 + 85 + 162}{30}$$

$$= 16.1$$

- 62. (G)** Use proportions to make the conversions:

Lorgs to dollars

$$\frac{140}{x} = \frac{7}{1}$$

$$7x = 140$$

$$x = \$20$$

Dalts to dollars

$$\frac{16}{x} = \frac{0.5}{1}$$

$$0.5x = 16$$

$$x = \$32$$

$$\text{Total dollars} = 20 + 32 = \$52$$

- 63. (E)** The values in the problem can be grouped into 3 terms that each contain a positive and negative value:  $(-2, 4)$ ,  $(-6, 8)$ ,  $(-22, 24)$ . Arrange the terms into 2 rows to determine the pattern and find the missing terms:

$$\begin{array}{cccc} -2 & -6 & \dots & -22 \\ 4 & 8 & \dots & 24 \end{array}$$

The values in the top row are decreasing by 4, while the values in the bottom row are increasing by 4. Fill in the remaining values:

$$\begin{array}{cccccc} -2 & -6 & -10 & -14 & -18 & -22 \\ 4 & 8 & 12 & 16 & 20 & 24 \end{array}$$

To find the sum, combine the terms as follows:  
 $(-2 + 4) + (-6 + 8) + (-10 + 12) + \dots + (-22 + 24)$

Note that each pair of parentheses sums to 2. Count the number of pairs of parentheses (6) and multiply to find the final answer:

$$2 + 2 + 2 + \dots + 2 = 6(2) = 12$$

- 64. (J)** To find the median, first count the number of tests (Xs) in the figure, which is 17. The median is the middle value. The middle value of 17 is 9. Counting from the left, find the ninth X in the figure to determine the median score (80).

- 65. (D)** The car gets between 20 and 22 miles per gallon. Ms. Grant would use the most gas if the car gets only 20 miles per gallon, so use this value. Then, use \$4.50 (the highest possible price per gallon) to determine the greatest amount of money she will spend:

$$200 \text{ miles} \div 20 \text{ miles per gallon} = 10 \text{ gallons of gas}$$

$$10 \text{ gallons} \cdot \$4.50 = \$45.00$$

- 66. (F)** It may be easier to see the order of the fractions by changing them to mixed numbers or decimals:

$$\frac{11}{3} = 3\frac{2}{3} = 3.666\dots$$

$$\frac{25}{7} = 3\frac{4}{7} = 3.57\dots$$

$$\frac{18}{5} = 3\frac{3}{5} = 3.6$$

The smallest fraction is  $\frac{25}{7}$ , followed by  $\frac{18}{5}$ , and finally  $\frac{11}{3}$ .

- 67. (A)** The only item on the chart that is priced above \$75 is the rain coat. Only one rain coat was purchased. Calculate the sales tax on the price of that rain coat:

$$\$102 \times 0.06 = \$6.12$$

- 68. (K)** First, find the length of  $\overline{PR}$ :  $4 - (-5) = 9$  units  
 Point Q is located  $\frac{1}{3}$  of the way from R to P, so calculate where that point would be:

$$9 \times \frac{1}{3} = 3 \text{ units}$$

So, point Q is located at  $4 - 3 = 1$ . Finally, calculate the midpoint of  $\overline{PQ}$ :

$$\text{Midpoint } PQ = \frac{-5 + 1}{2} = -2$$

- 69. (C)** To eliminate the decimals in this equation, multiply the numerators and denominators by 100:

$$\left(\frac{0.21}{0.33}\right)\left(\frac{100}{100}\right) = \left(\frac{x}{1.10}\right)\left(\frac{100}{100}\right)$$

$$\frac{21}{33} = \frac{100x}{110}$$

$$x = \left(\frac{110}{100}\right)\left(\frac{21}{33}\right)$$

$$x = \frac{70}{100} = 0.70$$

- 70. (K)** The climbers started at 125 feet below sea level, which can be expressed as  $-125$ . They stopped at 5,348 feet above sea level, which is expressed as a positive number. The elevation gain for the day is  $5,348 - (-125) = 5,473$  feet.



- 71. (C)** The tallest tree (T) goes in the middle, so there is only 1 possible location for that tree. The next two tallest trees (call them  $a$  and  $b$ ) go on either side of the tallest tree, so there are 2 possible options ( $aTb$  and  $bTa$ ). The final two trees ( $c$  and  $d$ ) go on either side of the set ( $caTbd$ ,  $daTbc$ ,  $cbTad$ ,  $dbTac$ ). So, there are 4 different ways to arrange the trees.

You could also use the counting principle to solve this:  $1 \times 2 \times 2 = 4$

- 72. (J)** First, find the sale price of the dress. If it is on sale for  $\frac{1}{3}$  off the original price, the sale price is  $\frac{2}{3}$  of the original price:

$$\$450 \times \frac{2}{3} = \$300$$

Alia has a 10% discount on the sale price. 10% of \$300 is \$30, so the discounted price will be:

$$\$300 - \$30 = \$270$$

Next, calculate the sales tax on the discounted price:

$$\$270 \times 0.06 = \$16.20$$

So, the total cost that Alia pays for the dress is:

$$\$270 + \$16.20 = \$286.20$$

- 73. (B)** All 6 of the smaller rectangles are congruent. Let the shorter side of one of these small rectangles be  $x$ . Based on the figure, the longer side is then  $4x$ , because the shorter side of four rectangles stacked together is the same length as the longer side of one rectangle. Using this information, you can now figure out the length and width of WXYZ:

$$\text{Width of WXYZ} = 4x$$

$$\text{Length of WXYZ} = x + 4x + x = 6x$$

Use the area of WXYZ to calculate  $x$ :

$$(4x)(6x) = 54$$

$$24x^2 = 54$$

$$x^2 = \frac{9}{4}$$

$$x = \frac{3}{2}$$

Now that  $x$  is known, use that to find the length and width of WXYZ:

$$\text{Width of WXYZ} = 4\left(\frac{3}{2}\right) = 6$$

$$\text{Length of WXYZ} = 6x = 6\left(\frac{3}{2}\right) = 9$$

$$\begin{aligned} \text{So, the perimeter of WXYZ} &= 2(6) + 2(9) \\ &= 12 + 18 = 30 \text{ cm} \end{aligned}$$

- 74. (H)** The question asks for integers that are **not** divisible by 2 or 3. Since all even numbers are divisible by 2, begin by listing the odd integers in this set:

$$13, 15, 17, 19, 21, 23, 25, 27, 29$$

Then, eliminate those integers that are multiples of 3. The remaining integers are:

$$13, 17, 19, 23, 25, 29$$

The answer is 6.

- 75. (B)** Let  $x$  equal the number of gallons needed to drive  $m$  miles. Set up a proportion to solve for  $x$ :

$$\frac{x}{m} = \frac{3}{65}$$

$$x = \frac{3m}{65}$$

- 76. (H)** First, add the percentage of cars containing 3 people, 4 people, and 5 or more people:

$$15\% + 7\% + 3\% = 25\%$$

Thus, 25% of the cars contained **at least** 3 people, so use that to calculate the number of cars:

$$420 \times 25\% = 105 \text{ cars}$$

- 77. (E)**  $z - \frac{1}{3}z = 12$

$$\frac{2}{3}z = 12$$

$$z = \frac{36}{2} = 18$$

- 78. (G)** To find when the two flashes occur at the same time, find the least common multiple of 12 and 18, which is 36. Every 36 minutes, the lights flash at the same time. The first time is 8:00 a.m. The next 6 times would be 8:36, 9:12, 9:48, 10:24, 11:00, and 11:36. Only 2 of those times are listed (9:12 a.m. and 10:24 a.m.).

- 79. (B)** Let  $c$  be Crystal's age:

$$3c + 2 = m$$

$$3c = m - 2$$

$$c = \frac{m - 2}{3}$$

- 80. (F)** One gram is equal to 1,000 milligrams, or

$$1 \text{ milligram is equal to } \frac{1}{1,000} \text{ gram.}$$

$$\text{Thus, 75 milligrams} = \frac{75}{1,000} = 0.075 \text{ gram.}$$

- 81. (D)** The line between  $-20$  and  $30$  is divided into 10 sections. Calculate the length of 1 section by finding the distance between  $-20$  and  $30$ , and dividing by the number of sections:

$$\frac{30 - (-20)}{10} = 5$$

So, the length of 1 section is 5 units and Point P is located at  $-5$ . To find the value of PQ, subtract the value of P from the value of Q:

$$30 - (-5) = 35$$

- 82. (G)** First, calculate the three possible values of  $q$ :

$$\text{If } n = 1, \text{ then } q = \frac{1}{3^1} = \frac{1}{3}.$$

$$\text{If } n = 2, \text{ then } q = \frac{1}{3^2} = \frac{1}{9}.$$

$$\text{If } n = 3, \text{ then } q = \frac{1}{3^3} = \frac{1}{27}.$$

The least value of  $r$  will occur when  $q$  is the smallest ( $q = \frac{1}{27}$ ). So, the least possible value of  $r$  is:  $r = 3(\frac{1}{27}) + 2 = \frac{1}{9} + 2 = 2\frac{1}{9}$

- 83. (B)** First, calculate the midpoints of  $\overline{AB}$  and  $\overline{BC}$  to find the locations of D and E, respectively:

$$D = \frac{-8 + 3}{2} = \frac{-5}{2}$$

$$E = \frac{3 + 7}{2} = 5$$

Now, find the midpoint of  $\overline{DE}$ :

$$\frac{\frac{-5}{2} + 5}{2} = \frac{\left(\frac{5}{2}\right)}{2} = \frac{5}{4} = 1.25$$

- 84. (H)** First, simplify N:

$$N = -(3 - 8 + 4) = -(-1) = 1$$

Then, find  $-|N|$ :

$$-|N| = -|1| = -1$$

- 85. (B)** First, find the sale price. 10% of \$44.50 is \$4.45, so the sale price is  $\$44.50 - \$4.45 = \$40.05$ . Next, find the price after Julian's employee discount.  $20\% \times \$40.05 = \$8.01$ , so the final price of the video game is  $\$40.05 - \$8.01 = \$32.04$ .

- 86. (G)** If the song is 5 minutes long, then it could be played up to  $60 \div 5 = 12$  times per hour. There are 9 hours between 8:00 a.m. and 5:00 p.m. So, the song could be played up to  $12 \times 9 = 108$  possible times between the given hours. Since the song is played 6 times per day, the probability of Samantha hearing the song is  $\frac{6}{108} = \frac{1}{18}$ .

- 87. (B)** In row B, a number appears twice—first under an odd number in row A, and then under the next even number in row A. So, the number 112 in row A would have a corresponding number 56 in row B. The numbers 111 and 112 in row A would both have 56 under them in row B.

- 88. (G)** First, find the number of liters that need to be added:

$$\frac{2}{3} \cdot 4,320 = 2,880 \text{ liters}$$

Use the conversion 1 kiloliter = 1,000 liters to find the number of kiloliters:

$$\frac{2,880}{1,000} = 2.88 \text{ kL}$$

- 89. (C)** The left side of the given equation ( $xy + xz = 100$ ) must be rearranged to look like  $\frac{x}{5}(3y + 3z) + 10$  to get the answer.

First, factor out the  $x$ :

$$x(y + z) = 100$$

Next, multiply both sides of the equation by 3:

$$3x(y + z) = 3(100)$$

$$x(3y + 3z) = 300$$

Then, divide both sides by 5:

$$\frac{1}{5}x(3y + 3z) = \frac{300}{5}$$

$$\frac{x}{5}(3y + 3z) = 60$$

Finally, add 10 to both sides:

$$\frac{x}{5}(3y + 3z) + 10 = 60 + 10$$

$$\frac{x}{5}(3y + 3z) + 10 = 70$$

Now that the left side looks like the expression in the question, the answer is the number on the right side (70).

- 90. (G)** Angle PQR and the marked  $40^\circ$  angle are vertical angles and thus are congruent, so angle PQR is  $40^\circ$ . Similarly, angle QRP is  $45^\circ$  because it is a vertical angle with the one marked  $45^\circ$ . Given those two angles, calculate the third angle of triangle PQR (angle RPQ):

$$40 + 45 + \text{RPQ} = 180$$

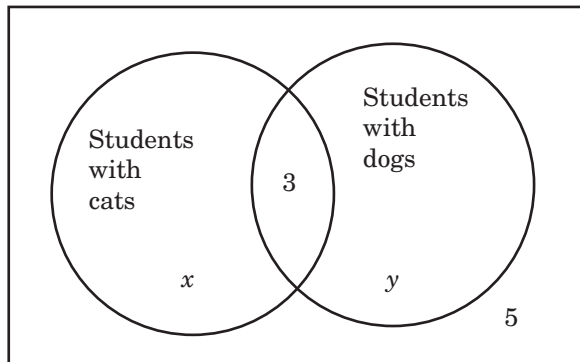
$$\text{RPQ} = 95$$

Angle RPQ and angle  $x$  are supplementary, which means they sum to 180, so  $x = 180 - 95 = 85$ . Similarly, angle  $y$  and angle QRP are supplementary, so  $y = 180 - 45 = 135$ .

$$\text{Thus, the value of } y - x = 135 - 85 = 50$$

- 91. (A)**  $(2p + 8) - (5 + 3p) = 2p + 8 - 5 - 3p = 3 - p$

- 92. (H)** This problem can be solved by creating a Venn diagram:



The circle on the left indicates the students with cats, and the circle on the right indicates students with dogs. The number outside both circles (5) is the number of students without cats or dogs. The number inside the intersection of the two circles (3) indicates the number of students who have both cats and dogs.

Calculate  $x$  and  $y$  using the given information: There are 20 students who have cats, and of those 20 students, 3 have cats and dogs. Thus,  $x = 20 - 3 = 17$ . There are 23 students who have dogs, and of those 23 students, 3 have cats and dogs. Thus,  $y = 23 - 3 = 20$ .

To find the total number of students surveyed, add the numbers in the diagram:

$$3 + 5 + x + y = 8 + 17 + 20 = 45$$

- 93. (C)** First, calculate the area of the entire lot:

$$75 \times 100 = 7,500 \text{ sq ft}$$

There are 12 equal-sized squares, so each square is equal to  $7,500 \div 12 = 625$  sq ft.

From the figure, it appears the building (shaded region) covers 1 full square, 1 half-square, and 2 quarter-squares, for a total of 2 full squares ( $1 + \frac{1}{2} + 2(\frac{1}{4}) = 2$ ). Two full squares are equal to  $625 + 625 = 1,250$  sq ft.

To find the area that is **not** shaded, subtract the area of the building from the area of the entire lot:

$$7,500 - 1,250 = 6,250 \text{ sq ft, which rounds to } 6,000 \text{ sq ft.}$$

Remember that the question asks you to find out **about** how many square feet and not **exactly** how many square feet.

- 94. (G)** The ratios of X:Y and Y:Z can be combined

because Y has the same value in both ratios.

So, X:Y:Z = 4:9:5. The proportion of X and Y in the mixture is  $\frac{4 + 9}{4 + 9 + 5} = \frac{13}{18}$ . Multiply the total weight of the mixture by the proportion to find the weight of the mixture after Z has been removed:

$$90 \times \frac{13}{18} = 65 \text{ g}$$

- 95. (E)** Let  $m$  = Marta's age now, and  $k$  = Kim's age now. Then 5 years ago, Marta's age was  $m - 5$ , and Kim's age was  $k - 5$ . Using the information in the question, set up the equation to solve for  $k$ :

$$k - 5 = 2(m - 5)$$

$$k = 2(m - 5) + 5$$

- 96. (F)** One revolution is equal to the circumference of the tire:

$$C = 2r\pi = 2(1)\left(\frac{22}{7}\right) = \frac{44}{7} \text{ feet}$$

The car travels at 4,400 feet per minute. To calculate the number of revolutions, divide the speed by the circumference:

$$4,400 \div \frac{44}{7} = 4,400 \cdot \frac{7}{44} = 700 \text{ revolutions}$$



**97. (D)** Madison’s car travels 27 miles one way to work, so it travels a total of 54 miles per day. In 5 days, it travels  $5 \times 54 = 270$  miles. Her car travels 30 miles on each gallon of gas, so it uses  $\frac{270}{30} = 9$  gallons of gas per week. To find the total savings, multiply the number of gallons by the savings per gallon:  $9 \text{ gallons} \cdot \$0.05 = \$0.45$

**98. (K)** Let  $x$  = the mean number of hours Nam worked per day during the first 8 days.

Then,  $x + 2$  is the number of hours he worked on each of the last 2 days. Since he worked 69 total hours, set up the equation and solve for  $x$ :

$$8x + 2(x + 2) = 69$$

$$10x + 4 = 69$$

$$10x = 65$$

$$x = 6.5$$

Remember that  $x$  is the mean hours worked the first 8 days. The question asked for the number of hours Nam worked the **last** two days:

$$2(x + 2) = 2(6.5 + 2) = 2(8.5) = 17.0 \text{ hours}$$

**99. (A)** First, find the prime factorization of 5,355:

$$5,355 = 5 \cdot 1,071 = 5 \cdot 9 \cdot 119 = 3^2 \cdot 5 \cdot 7 \cdot 17$$

The greatest prime factor is 17.

**100. (G)** Using the counting principle, the first digit has 6 possible values (1 through 6). The second digit then has 5 possible values, and the third digit has 4 possible values. So the total number of possible different ID numbers is  $6 \times 5 \times 4 = 120$ .

### Answer Key for Sample Form B

Paragraph 1 S R T U Q	11. C	21. C	31. C	41. D	51. E	61. C	71. C	81. D	91. A
Paragraph 2 T S U R Q	12. K	22. J	32. F	42. K	52. K	62. G	72. J	82. G	92. H
Paragraph 3 R U Q T S	13. C	23. B	33. D	43. D	53. E	63. E	73. B	83. B	93. C
Paragraph 4 Q S R U T	14. G	24. H	34. F	44. G	54. H	64. J	74. H	84. H	94. G
Paragraph 5 Q U T S R	15. A	25. D	35. E	45. A	55. D	65. D	75. B	85. B	95. E
	16. K	26. K	36. G	46. K	56. J	66. F	76. H	86. G	96. F
	17. C	27. B	37. C	47. A	57. A	67. A	77. E	87. B	97. D
	18. G	28. H	38. K	48. H	58. J	68. K	78. G	88. G	98. K
	19. A	29. D	39. B	49. A	59. A	69. C	79. B	89. C	99. A
	20. J	30. J	40. F	50. G	60. G	70. K	80. F	90. G	100. G