**17.** (**C**) The letter V appears in the second and fourth sentences. Find the word that also appears only in those two sentences. Options A and B are incorrect because the words "chili" and "spicy" appear in the second sentence, but not in the fourth. Option D, "sweet," appears in the first and fourth sentences, but not in the second sentence, so it can be ruled out. The word "hot" is the only word that appears in both the second and fourth sentences, and it is the correct answer.

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**18.** (**H**) This question contains two conditional statements. You can put the two sentences together: When Tomas is wearing a white shirt, he is also wearing a tie and black shoes. Thus, Option H must be true.

$$W \rightarrow T \rightarrow B$$

The first sentence only tells us what will happen *when* Tomas wears his white shirt. It says nothing about what will happen when Tomas does **not** wear his white shirt. Therefore, it is incorrect to conclude that when Tomas wears a tie he is also wearing a white shirt. Likewise, the second sentence tells us only what will happen *when* Tomas wears a tie. It doesn't tell us what will happen when Tomas does **not** wear a tie. We cannot conclude that whenever Tomas wears his black shoes he is also wearing a tie.

---

**19.** (**A**) This question asks you to determine which of the six houses have fenced yards and which have porches. Start with the most definite information—that three houses have porches (Statement 2), and they are not next to one another (Statement 3). This creates four possible arrangements of houses with porches:

| L | M | N | P | Q | R |
|---|---|---|---|---|---|
| Yes | No | No | Yes | No | Yes |
| Yes | No | Yes | No | No | Yes |
| Yes | No | Yes | No | Yes | No |
| No | Yes | No | Yes | No | Yes |

Statement 1 says that the two houses with fenced yards are immediately next to one another. The third and fourth arrangements above do not allow this condition, because a house with a porch cannot have a fenced yard (Statement 4). Two possibilities remain, as shown below, and we cannot determine which is correct.

| House | L | M | N | P | Q | R |
|---|---|---|---|---|---|---|
| Porch? | Yes | No | No | Yes | No | Yes |
| Fenced yard? | No | Yes | Yes | No | No | No |

**or**

| House | L | M | N | P | Q | R |
|---|---|---|---|---|---|---|
| Porch? | Yes | No | Yes | No | No | Yes |
| Fenced yard? | No | No | No | Yes | Yes | No |

Options B, C, D, and E are true for one of the possibilities, but not the other. None of them **must** be true for both possibilities. Option A is true for both possibilities, and it is the correct answer.

---

**20.** (**H**) Read each option to determine whether it **must** be true. Option F is ruled out because the question refers to only two conditions, afraid or not afraid of heights. There are no comparisons of degrees of fear. The question does not state the requirements for joining the Skydiving Club (Option G), only for maintaining one's membership. Option H is correct; some people who are afraid of heights belong to the Skydiving Club, and these people make three jumps a month. There is no support for Option J, and Option K applies to skydivers in general, not to members of the Skydiving Club.

### ▶▶▶ Reading

### ▶ Wolves

**21.** (**E**) You are asked to identify the main theme of the passage. Every paragraph discusses the reasons that wolves howl, and the best answer is Option E, "purposes of wolf howling." Option A and B are details, not the main theme. Option C is too broad for a passage that describes only wolf behavior. Option D is not mentioned at all.

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**22.** (**G**) Read each option to find the statement that is **not** supported by the passage. Option F is supported by lines 18-20, so it cannot be the correct answer. In evaluating Option G, notice that the passage gives two examples of wolves communicating outside their own pack: lines 18-20, which describe howling to mark the boundaries of a pack, and lines 37-39, which describe a lone wolf looking for other wolves to begin a new pack. These examples indicate that wolves sometimes communicate outside of their own pack, contradicting Option G, and thus making it the correct answer. Option H is clearly stated in lines 22-23, Option J is supported in lines 16-18 and 40-42, and lines 16-18 rule out Option K.

**23.** (**C**) The comparison of birdsong to howling is found in lines 18-21: "howling may be a way to mark the boundaries of a pack's territory, in the same way that some birds use birdsong to warn other birds away." Only one option (C) restates this idea. Options A, B, and E are specific to wolves, not to birds, and Option D is not mentioned at all.

**24.** (**F**) Option F, "to celebrate a successful hunt," is mentioned in lines 17-18. Is it the best answer? The question asks about wolves howling in chorus, ruling out the reasons that a lone wolf might howl (Options G and J). Options H and K are not mentioned in the passage. Option F is the best answer.

**25.** (**A**) The question refers you to the last paragraph. Some observers have claimed that wolves fake their howling in order to fool other wolves, followed by examples: deceptions about maturity (a young wolf sounding like an older wolf) or numbers (a few wolves sounding like nearly a dozen). In other words, they deceive their enemies about their lack of protection, which is Option A, "vulnerability." Options B, D, and E are mentioned in the passage, but not in the context of deceiving enemies. Option C is not mentioned.

**26.** (**K**) The possibility that wolves are capable of fooling other wolves in times of danger, to disguise their youth or small numbers, is discussed in the last paragraph. Some researchers doubted this claim, as described in lines 57-60. Their doubt is based on the fact that wolf hearing is too keen to be deceived, which is Option K. Options F and H support the claim that wolves **can** fake their howling, so they cannot be correct. Options G and J are not supported by the passage.

## ▶ Samizdat

**27.** (**D**) The correct answer must incorporate all of the important elements of the reading passage, yet it must not be overly broad. Option A mentions two important samizdat writers, but they are mentioned only in the fourth paragraph and are not the main topic. Option B refers to all poetry published in the Soviet Union, not limited to samizdat poetry, so it is too broad. Option C is incorrect because the passage is about the Soviet Union, which had neither a free press nor a free society (lines 6-9). Option D is a good summary of the passage, describing Soviet censorship and the samizdat response. Option E is mentioned only briefly in the first paragraph and does not summarize the theme of the passage.

**28.** (**H**) The earliest phase of samizdat is described in lines 35-36: "At first, samizdat focused mainly on literature, such as poetry and novels." Only Option H, a short story, fits into this category. None of the other options are representative of the earliest phase of samizdat, though they might be examples of later stages.

**29.** (**B**) To answer this question, you must read more than the sentence containing the phrase "a knock at his door in the middle of the night" (lines 47-48). Reread the fourth paragraph. It says that Pasternak feared that he would appear disloyal to the Soviet state. What did he fear? Lines 18-19 state, "Most worried that they were being watched by the government's secret police." The correct answer is most likely that Pasternak feared a visit by the secret police, which is Option B. The other options are mentioned in the passage but are not objects of fear, as the secret police were.

**30.** (**J**) The correct answer must be in the last paragraph, the only paragraph to mention computers (lines 66-70). The passage does not specify the content of the texts stored on computers, so Options F and G can be ruled out. Nor did the computers give access to Russian stores, which eliminates Option H. Option J is the best answer, since storing and circulating texts via computers is more efficient than typing or hand-copying samizdat texts. Option K is not mentioned in the passage.

**31.** (**B**) Because a samizdat document was unsigned or signed with a false name (lines 33-34), the identity of the original writer or copyist was not part of the document. The answer to this question is not stated directly in the passage but can be inferred from lines 16-19. The best answer is that the unsigned documents protected samizdat writers from capture and punishment, which is Option B. Options A and E are not likely reasons—the materials were in fact smuggled outside the Soviet Union and copied over and over. Option C might look attractive, but the samizdat documents were unsigned to protect the identities of the writers, not of the secret police. Since all samizdat documents were unsigned, that was not a factor in judging their trustworthiness (Option D).

**32.** (**F**) The answer is found in lines 71-75. The correct answer, Option F, makes the connection between the abolishment of censorship and subsequent freedom of the press, which eliminated the need for samizdat. The passage does not support Options G or K, and it contradicts Option H. Option J is a true statement, but is not the reason that samizdat networks ended.

### ▶ Ice

**33.** (**C**) The structure of the passage is straightforward. It begins by asking why ice is slippery (lines 3-5) and reviews several theories of slipperiness: smoothness, friction, pressure, and Faraday's theory. Option C, "answers to the question of what makes ice slippery," summarizes the theme of the passage. Option A is not mentioned, and Options B, D, and E are details, not the main idea.

**34.** (**F**) Read the entire last paragraph. The writer says, "The phenomenon of a slippery liquid-like surface is not limited to ice," then goes on to mention lead and diamond crystals. The most likely reason that the author mentions these crystals is to illustrate that solids other than ice have slippery surfaces, which is Option F. Option G cannot be correct because these crystals are made of lead and carbon, not water. The properties of lead and diamond crystals do not cast doubt on Faraday's theory, ruling out Option H. While it is possible that scientists might shoot electrons at lead and diamond surfaces (Option J) or find new uses for slippery substances (Option K), these are not mentioned in the passage.

**35.** (**C**) Faraday's experiment is described in the fourth paragraph, which states that the liquid on the ice cubes' surfaces froze solid when the surfaces made contact (lines 45-46). This information is restated in the correct answer, Option C. Option A is incorrect because Faraday's explanation does not include the concept of friction. Options B and D are not supported by the passage. While the surfaces of the ice cubes might be smooth (Option E), the "smoothness" explanation of slipperiness was ruled out in the first paragraph.

**36.** (**F**) The 1996 experiment at Lawrence Berkeley Laboratory is mentioned in lines 52-58. The data from this experiment suggested that the ice surface remained "liquid-like," creating a slippery layer of molecules on the ice surface. This conclusion is best summarized by Option F. Option G is wrong because the experiment illustrated the power, not the weaknesses, of scientific technology. Option H is impossible: the experiment was conducted long after Faraday's lifetime (150 years ago, see line 40). Option J contradicts the scientists' conclusion, and Option K refers to Faraday's experiment, not the Lawrence Berkeley Lab experiment.

**37.** (**B**) This question asks you to distinguish between "liquid-like" and "liquid." The distinction between the two terms is made in lines 65-68: on the ice surface, "the molecules move only up and down; if they also moved side to side, they would constitute a true liquid." Thus,

the surface of ice is liquid-like because the surface molecules move only up and down, which is Option B. Option A describes the result of the experiment, not the ice surface itself. Option C can be ruled out because "wet" and "liquid" are synonyms. Option D cannot be evaluated—we do not know from the passage whether the ice surface is slipperier than a liquid surface. Option E contradicts the passage, which says that the molecules on the ice surface are in motion.

**38.** (**K**) The friction theory of slipperiness is explained in the second paragraph, which concluded that the theory cannot explain why ice is slippery for someone who stands motionless, creating no friction. A phenomenon that a theory cannot explain can be said to weaken, or undermine, the theory. Option K, "a person slipping while standing immobile on ice," is the best answer. Option F undermines the pressure theory of slipperiness, not the friction theory, while Option J undermines the "smoothness" explanation. Options G and H neither support nor undermine the friction theory.

### ▶ Great Zimbabwe

**39.** (**D**) You are asked to identify the general topic of the passage. Options B and E refer to only parts of the passage. Option C is not mentioned at all. Option A is too broad; most of the passage is about Great Zimbabwe, not the nation of Zimbabwe. Option D, "the true story of the Great Zimbabwe ruins," is best.

**40.** (**G**) This is a synthesis question, in which the basis for the correct answer is found in several places in the passage. First, find the section that mentions Richard Hall's opinion. Lines 52-54 state that Hall was "convinced that the structures had been built by ancient people from the Middle East." Later, Hall's opinion was discredited by archaeologists who demonstrated that Great Zimbabwe was African, not Middle Eastern, in origin (lines 64-65). In other words, Hall's opinion was inaccurate. All five options must be evaluated to find the option with which the passage's author would most likely agree. Option F is not correct: Hall's first impression (that the structures were built by people from the Middle East) was inaccurate. The author would not agree with Option H: the present culture of the Shona people is not illustrative of their past. The author does not take any stand on whether advanced cultures developed first in the Middle East, ruling out Option J, nor does the author claim that Middle Eastern culture was derived from Shona culture (Option K). The best answer is Option G. A preconception is an opinion formed in advance of actual knowledge, which perfectly describes Hall's belief.

Hall's preconception that Great Zimbabwe was built by people from the Middle East clouded his judgment.

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**41.** (**E**) Read the entire last paragraph, which implies that discussion of "one mystery of Great Zimbabwe" has just been concluded, and the author is making a transition to another mystery. The previous paragraph showed that Great Zimbabwe was built by ancestors of the Shona people during the fourteenth or fifteenth century, not by ancient people from the Middle East. Thus, the mystery, now solved, was who had built Great Zimbabwe and when (Option E). Option A is a detail of the correct answer, but incorrect because the mystery comprised much more than the foreign wares discovered in the ruins. Option B, "why the settlement was abandoned," is the remaining mystery, not the mystery that had been solved. The source of the gold and ivory (Option C) and the reason that Europeans did not discover Great Zimbabwe until the 1870s (Option D) are not presented as mysteries.

---

**42.** (**H**) The Shona people are discussed in the fifth paragraph. Since the question is open-ended, we must evaluate each option to find the best answer. The Shona people still exist as a distinct group (line 68), ruling out Option F. Shona kings traded their goods in coastal towns (lines 72-74), implying that they lived in the African interior, not the coast, eliminating Option G. (This conclusion is also supported by line 18: "a mysterious stone city in the African interior.") Lines 65-68 state that Great Zimbabwe was most likely built by ancestors of the present-day Shona people, which supports Option H. Options J and K confuse the histories of the Shona people and ancient Middle Eastern people. Option H is the best answer.

---

**43.** (**E**) The statement "Archaeology was still in its infancy" (lines 51-52) implies that the field of archaeology was young and immature in the 1870s. The statement is followed by descriptions of how early explorers, including Richard Hall, discarded valuable archaeological material that would have revealed the true history of Great Zimbabwe. Thus, the "infancy" of archaeology is illustrated by Option E, "the excavations conducted by Richard Hall." Options A and B are events in Shona history, not the history of archaeology, and Options C and D are references to more advanced stages of archaeology, not to its infancy.

---

**44.** (**F**) The phrase "relationship of Portuguese explorers to Great Zimbabwe" is open-ended, and thus each option should be evaluated in turn. Option F is correct; the Portuguese searched for Great Zimbabwe but never found it (lines 26-27). It is a good idea to read the remaining options to be sure that none of them is better than

Option F. Options G, H, and K are incorrect because the Portuguese never found Great Zimbabwe or King Solomon's mines. The destruction of archaeological evidence was committed by subsequent explorers, not the Portuguese, which rules out Option J. Option F is the best answer.

## ▶ Cross Country

**45.** (**E**) Options A and B are details, not the main theme. Options C and D are too broad—the passage is about one automobile journey, not travel in general. Option E, "a historic automobile trip by twentieth-century pioneers," correctly sums up the main idea of the passage.

---

**46.** (**F**) The correct answer (Option F) is stated directly in the preceding sentence (lines 31-32): "Residents of some small towns had never seen an automobile."

---

**47.** (**B**) Read the entire sentence to understand the context of the phrase. "The modern machine attracted so much attention that Jackson's bulldog Bud was given the responsibility of guarding the car from people who, enchanted by its novelty, were tempted to steal a shiny piece as a souvenir." A novelty is something new or unusual. In this sentence, the novelty is the car, Option B. Option E, "journey," might look attractive because the journey could also be considered a novelty, but "journey" does not fit the sentence—it does not have shiny pieces that people were tempted to steal.

---

**48.** (**G**) The incident with the farmer and his horses is described in lines 39-44. The car sank into quicksand and had to be pulled out by a farmer's team of horses. Options F and K are contradicted, not supported, by this incident. Option H refers to another incident. Option J might or might not be true, but the incident is about only one quicksand pit, not many. Option G is the correct inference. Despite their modern machine, Jackson and Crockett occasionally needed help from other people, such as the farmer.

---

**49.** (**C**) A cross-country automobile trip in 1910 is mentioned in lines 51-54: "By 1910, other drivers, benefitting from better driving conditions, had shortened the transcontinental crossing time to ten days." Better driving conditions imply better highways, which is Option C.

---

**50.** (**F**) The complete phrase is "their predecessors who traveled in covered wagons" (lines 56-58). The only option that fits that description is "the early settlers" (Option F).

**51. (A)** AB lies between 0 and 1 on the number line. A is the lower limit of $x$ and B is the upper limit. The area between 0 and 1 is divided into 6 equal segments, so $A = \frac{1}{6}$ and $B = \frac{3}{6} = \frac{1}{2}$.

**52. (J)** Let $x$ represent the lowest score that Hilary can receive and earn a B, which requires an average score of 80 points. Set up the equation for the calculation of a mean of 80:

$$\frac{91 + 72 + 69 + 83 + x}{5} = 80$$

$$91 + 72 + 69 + 83 + x = 400$$
$$315 + x = 400$$
$$x = 85$$

**53. (A)** When the three 14-foot chains are linked end to end, their length is $3 \times 14$ ft $= 42$ ft. Let $x$ represent the length of one of the longer chains and set up an equation:

$$42 + 2x = 100$$
$$2x = 58$$
$$x = 29$$

**54. (K)** To find "how many times older," divide the age of the earth by the age of the artifact:

$$\frac{5.2 \times 10^9}{1.3 \times 10^7} = \frac{5.2}{1.3} \times \frac{10^9}{10^7}$$

$$= 4.0 \times 10^2$$

**55. (B)** The first step is to cross-multiply. Then, use the distributive property. Next, combine like terms and solve the equation:

$$3(7 + n) = 1(43 + n)$$
$$21 + 3n = 43 + n$$
$$3n - n = 43 - 21$$
$$2n = 22$$
$$n = 11$$

**56. (H)** To get the prime factorization, divide out prime numbers until all that is left are prime numbers. One way is shown below:

$$
\begin{aligned}
1{,}200 &= 2 \times 600 \\
&= 2 \times 2 \times 300 \\
&= 2 \times 2 \times 2 \times 150 \\
&= 2 \times 2 \times 2 \times 2 \times 75 \\
&= 2 \times 2 \times 2 \times 2 \times 5 \times 15 \\
&= 2 \times 2 \times 2 \times 2 \times 5 \times 3 \times 5 \\
&= 2^4 \times 3 \times 5^2
\end{aligned}
$$

**57. (B)** Substitute $y - 7$ for $x$ and simplify the expression:

$$3(y - 7) - 3$$
$$3y - 21 - 3$$
$$3y - 24$$

**58. (H)** First, calculate the total distance Laura traveled:

$(15 \text{ mph}) \times (2 \text{ hr}) = 30$ miles
$(12 \text{ mph}) \times (1 \text{ hr}) = 12$ miles

Total distance traveled $= 30 + 12 = 42$ miles. Total time traveled $= 2 + 1 = 3$ hours.

To calculate her average speed for the entire ride, divide total distance traveled by total time traveled:

$42 \div 3 = 14$ miles per hour

**59. (E)** Using the counting principle:

4 people can be chosen for the first position
3 people can be chosen for the second position
2 people can be chosen for the third position
1 person can be chosen for the fourth position

So, $4 \times 3 \times 2 \times 1 = 24$.

Another way to solve this problem is by writing out all the possible permutations (using the letters L, M, P, and R to represent the four people) and then count them:

| | | | |
|---|---|---|---|
| LMPR | MLPR | PLMR | RLMP |
| LMRP | MLRP | PLRM | RLPM |
| LPMR | MPLR | PMLR | RMLP |
| LPRM | MPRL | PMRL | RMPL |
| LRMP | MRLP | PRLM | RPLM |
| LRPM | MRPL | PRML | RPML |

**60. (G)** Begin by cross-multiplying to eliminate the fraction, then combine like terms and solve for $m$:

$$5m - 3 = 4(2 + m)$$
$$5m - 3 = 8 + 4m$$
$$m = 11$$

---

**61. (D)** Substitute $^-3$ into the expression wherever you see an $x$, and then simplify:

$$4x^2 + 5x - 8$$
$$4(^-3)^2 + 5(^-3) - 8$$
$$4(9) - 15 - 8$$
$$13$$

---

**62. (K)** The formula for the area (A) of a rectangle is length ($l$) times width ($w$): $A = l \cdot w$. The question defines the length in terms of the width: $l = 3w$. Substituting $3w$ for $l$, we get:

$$A = 3w \cdot w = 3w^2$$

Since the question states that $w = 8$:

$$3(8^2) = 3(64) = 192 \text{ sq ft}$$

---

**63. (C)** Since 75% is the same as $\frac{3}{4}$, we know the number of students in the class must be divisible by 4. The number of students in the class also needs to be divisible by 6, since exactly $\frac{1}{6}$ of the students do not have a book bag.

The numbers between 30 and 41 that are divisible by 4 are 32, 36, and 40. Of those three numbers, only 36 is also divisible by 6. So the answer is C, 36.

---

**64. (K)** The angles are formed by the intersection of two lines. The angle labeled 53° is opposite to the unlabeled angle, which by definition is also 53°. The sum of the four angles is 360°. Neither $x$ nor $y$ is being solved for, only their sum $(x + y)$.

$$x + y + 2(53) = 360$$
$$x + y = 360 - 106$$
$$x + y = 254$$

**65. (D)** When the sum of two integers is odd, one integer must be odd and the other must be even. The sums N + M and M + T are both odd. If M is odd, then both N and T are even. If M is even, then both N and T are odd.

Evaluate each answer option. Options A and B **may** be true, but neither **must** be true. If N and T are both even, their product will be even; if both are odd, their product will be odd. Thus, neither option **must** be true.

Regardless of whether N and T are both odd or both even, Options C and E cannot be true. In both cases, N − T and N + T would be even.

Option D will always be true, because the sum of two odd numbers is always even and the sum of two even numbers is always even.

---

**66. (H)** $\dfrac{4.5}{0.1} \times 0.22 = 45 \times 0.22 = 9.9$

---

**67. (D)** Begin by evaluating the problem as it is written. Following the order of operations, we first calculate the expression in the parentheses, and then perform the division:

$$(8 - 16) \div (^-8 + 6)$$
$$= (^-8) \div (^-2)$$
$$= 4$$

Now, remove the parentheses and evaluate the resulting expression. Following the order of operations, we first perform the division and then the addition:

$$8 - 16 \div {}^-8 + 6$$
$$= 8 + \frac{^-16}{^-8} + 6$$
$$= 8 + 2 + 6$$
$$= 16$$

To calculate how the value of the expression changes by removing the parentheses, subtract the first answer from the second answer:

$$16 - 4 = 12$$

The expression will change by an increase of 12.

**68. (F)** To find the value of $x$ in terms of $y$, solve for $x$:

$$2x + 2y - 6 = 14$$
$$2x + 2y = 20$$
$$x + y = 10$$
$$x = 10 - y$$

**69. (D)** First, calculate the number of complete trips around the merry-go-round the child will make. Then, determine how many horses remain in the final trip. 337 (the number she stops at) divided by 25 (the number of horses on the merry-go-round) equals 13, with a remainder of 12. Thus, the child will walk around the merry-go-round 13 complete times and stop at the $12^{th}$ horse on her next trip. The $12^{th}$ letter of the alphabet is L, so the answer is D.

**70. (K)** Since there are 16 ounces in 1 pound, the question asks how much we would pay for 16 ounces of this candy. Set up a proportion based on what is given in the problem:

$$\frac{5 \text{ oz}}{\$1.50} = \frac{16 \text{ oz}}{x}$$

Now, solve for $x$, which would be the price of 16 ounces of candy:

$$5x = 16(\$1.50)$$
$$5x = \$24$$
$$x = \$4.80$$

**71. (B)** A ratio of 3:2 means that in any group of

5 people, 3 are women and 2 are men.

Thus, $\frac{3}{3 + 2}$ or $\frac{3}{5}$ are women. $\frac{3}{5} = \frac{6}{10} = 60\%$.

**72. (H)** 75 is evenly divisible by 15, so 77 (i.e., 75 + 2) is the first integer that has a remainder of 2 when divided by 15. Add 15 to 77 (= 92) to get the next integer. Add 15 to 92 (= 107) to get the next integer. However, 107 is larger than 105, so only 2 integers (77 and 92) satisfy the conditions, and the correct answer is H.

**73. (B)** Solve the equation:

$$\frac{2(x + 1)}{3} = 1$$

$$2x + 2 = 3$$

$$x = \frac{1}{2}$$

**74. (G)** After the initial $2.00 charge, the cost per mile is $0.30 \times 5 = \$1.50$. Let $x$ equal the number of miles ridden for a $20 fare, and set up an equation for the total cost of the taxi ride:

$$\$2.00 + \$1.50x = \$20.00$$
$$\$1.50x = \$18.00$$
$$x = 12 \text{ miles}$$

**75. (B)** First, calculate the location of point J using the location of point K and the given length of JK:

$$\frac{3}{8} - 3\frac{1}{2} = {}^{-}3\frac{1}{8}$$

Now, use the location of point J to calculate the location of point M using the length of JM:

$$^{-}3\frac{1}{8} + 9\frac{3}{4} = 6\frac{5}{8}$$

Finally, use the location of point M to calculate the location of point L using the length of LM:

$$6\frac{5}{8} - 1\frac{1}{8} = 5\frac{1}{2}$$

**76. (G)** Shelby paid 40% on the first day of the month and 25% on the tenth day. That means she owes a total of 35% on the twentieth day ($100\% - 40\% - 25\% = 35\%$).

$$\$800 \times 0.35 = \$280$$

Another way to solve this problem is to calculate what Shelby paid on each day and subtract that from the total amount due:

First day: $\$800 \times 0.40 = \$320$
Tenth day: $\$800 \times 0.25 = \$200$
Twentieth day: $\$800 - \$320 - \$200 = \$280$

**77. (D)** Substitute $^{-}2$ for $x$ and 3 for $y$, and simplify the expression:

$$5x - 2xy$$
$$5(^{-}2) - 2(^{-}2)(3)$$
$$^{-}10 - (^{-}12)$$
$$^{-}10 + 12$$
$$2$$

**78.** (**F**)  Because both triangles are right triangles that share a vertex, they are similar. To find $x$, set up a proportion using the two known sides of each triangle:

$$\frac{(4 + x)}{1.0} = \frac{4}{0.8}$$

$$0.8\,(4 + x) = 1.0\,(4)$$

$$4 + x = 5$$

$$x = 1$$

**79.** (**E**)  Start by setting up an equation for each comparison mentioned in the problem:

**Equation 1:** $s = 4l$
**Equation 2:** $2p = 5d$
**Equation 3:** $3h = p$
**Equation 4:** $5s = 2h$

Now, assign a value to one variable and solve for the others:

Let $l = 1$
So, using Equation 1: $s = 4 \cdot 1 = 4$

Then, use Equation 4: $5 \cdot 4 = 2h$
$10 = h$

Then, use Equation 3: $3 \cdot 10 = p$
$30 = p$

Finally, use Equation 2: $2 \cdot 30 = 5d$
$12 = d$

Now that the values of all 5 coins are known, the coin with the greatest value is plunk (30).

**80.** (**H**)  Raoul is now R years old, and Phil is 8 years older:
$$P = R + 8$$
Two years from now, Phil will be twice as old as Raoul:
$$(P + 2) = 2(R + 2)$$
By substitution,
$$[(R + 8) + 2] = 2\,(R + 2)$$
$$R + 10 = 2R + 4$$
$$6 = R$$
Raoul is currently 6 years old.

**81.** (**D**)  First, calculate the area we need to paint:

2 walls each measuring 12 ft by 9 ft
$= 2 \times 12 \times 9 = 216$ sq ft

2 walls each measuring 10 ft by 9 ft
$= 2 \times 10 \times 9 = 180$ sq ft

Total area $= 216 + 180 = 396$ sq ft

1 qt covers 100 sq ft, so divide the total square feet by 100 to find the number of quarts needed:

$\frac{396}{100} = 3.96$ qt

Since we cannot buy a partial can of paint, we need to round up. The answer is 4 quarts.

**82.** (**G**)  Rearrange the equation so that $nm$ is on one side:
$$60 = 24nm$$
$$2.5 = nm$$

**83.** (**C**)  Find the multiples of 7 and multiples of 5, add the remainders to each multiple, and look for the first number to appear in both lists:

| Multiples of 7: | 7 | 14 | 21 | 28 | 35 … |
|---|---|---|---|---|---|
| Add 3 to each: | 10 | 17 | 24 | 31 | 38 … |

| Multiples of 5: | 5 | 10 | 15 | 20 | 25 … |
|---|---|---|---|---|---|
| Add 2 to each: | 7 | 12 | 17 | 22 | 27 … |

17 is the first number to appear in both sequences, so it is the least possible value to meet the conditions.

An alternative way to solve this problem is to test each answer option to see which one fits the criteria.

**84.** (**H**)  The question states that the mean of 4 of the numbers is 50. To solve this problem, we can assume that the value of each of those 4 numbers is 50.

Now, let $x$ equal the mean of the other 16 numbers. Set up an equation using the mean of all 20 numbers to find the value of $x$:

$$\frac{4(50) + 16x}{20} = 42$$

$$200 + 16x = 840$$

$$16x = 640$$

$$x = 40$$

**85.** (**D**) For $x$, determine the perfect square that lies between 50 and 65. $8^2 = 64$, so $x = 8$. For $y$, find the perfect square that lies between 17 and 32. $5^2 = 25$, so $y = 5$. Then multiply $x$ and $y$:

$$8 \times 5 = 40$$

To quickly solve problems like this, it is important to know the perfect squares at least through $12^2 = 144$.

**86.** (**J**) Twenty-five percent of the sample of 2,000 homes is 500 homes. The first year in which at least 500 homes had DVRs was 2006, which is Option J.

**87.** (**B**) We know that 300 dollars = 192 nobles. To figure out how many nobles are equal to 1 dollar, divide each side of the equation by 300:

$$300 \text{ dollars} \div 300 = 192 \text{ nobles} \div 300$$

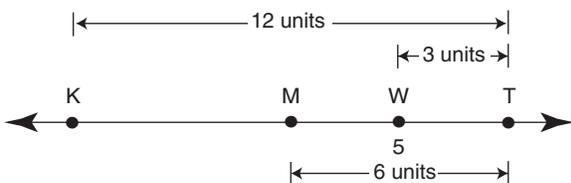$$1 \text{ dollar} = \frac{192}{300} \text{ nobles} = \frac{16}{25} \text{ nobles}$$

**88.** (**G**) First, change both fractions into mixed numbers:

$$\frac{28}{3} = 9\frac{1}{3}$$

$$\frac{83}{5} = 16\frac{3}{5}$$

The positive integers between these mixed numbers are 10, 11, 12, 13, 14, 15, and 16. So the answer is 7.

**89.** (**C**) We know that KT = 12 units and M is the midpoint of $\overline{\text{KT}}$, so MT = 6 units. We know that W is the midpoint of $\overline{\text{MT}}$, so WT = 3 units.



If we assume that K is smaller than T, then K must be to the left on the number line and T must be to the right. Since we know that W is at 5 on the number line, T must be at 8 because WT = 3 units, and M must be at 2, since MW = 3 units.

Given that KT = 12, and T is at 8 on the number line, then K must be at $^-4$.

Finally, we need to find the midpoint of $\overline{\text{KW}}$:

$$\frac{^-4 + 5}{2} = \frac{1}{2} = 0.5$$

Note: The question asks for "a possible midpoint" of $\overline{\text{KW}}$ because there is no information about whether K is smaller than T, or T is smaller than K. In the explanation above, we assumed that K is smaller than T. If we assume T is smaller than K, we would get a different answer for the midpoint of $\overline{\text{KW}}$ (9.5), which is not among the answer options.

**90.** (**H**) First, calculate what $t$ is when the two planes are equal distances from the airport. Set the two distances equal to each other and solve for $t$:
$$310 - 2t = 3t + 235$$
$$^-5t = ^-75$$
$$t = 15$$

The question asks "what is the difference between their altitudes?" To answer this, we need to subtract the two altitudes:

$(32,800 - 20t) - (31,600 + 40t)$
$= 32,800 - 20t - 31,600 - 40t$
$= 1,200 - 60t$

Now, substitute the value of $t$ into the expression:

$= 1,200 - 60(15)$
$= 1,200 - 900$
$= 300$ ft

**91.** (**C**) Since $A_k = \frac{1}{k}$, then $A_1 = \frac{1}{1}$, $A_2 = \frac{1}{2}$, and so on.

$A_1A_2 + A_2A_3 + A_3A_4 + A_4A_5 + A_5A_6$

$= \frac{1}{1} \times \frac{1}{2} + \frac{1}{2} \times \frac{1}{3} + \frac{1}{3} \times \frac{1}{4} + \frac{1}{4} \times \frac{1}{5} + \frac{1}{5} \times \frac{1}{6}$

$= \frac{1}{2} + \frac{1}{6} + \frac{1}{12} + \frac{1}{20} + \frac{1}{30}$

$= \frac{30 + 10 + 5 + 3 + 2}{60}$

$= \frac{50}{60}$

$= \frac{5}{6}$

**92. (G)** There are two extreme values for the number of drivers who both wear glasses and are over age 30. (There are many more values between the extremes, but this explanation focuses on the largest and smallest.)

**Value 1:** If the 10,000 who do **not** wear glasses ($50,000 - 40,000$) are all 30 years old or less, that means that all 30,000 of the drivers over 30 must wear glasses.

**Value 2:** If the 10,000 who do **not** wear glasses are all over 30, that means that 20,000 of the drivers over 30 ($30,000 - 10,000$) must wear glasses.

Of those two values, 20,000 is smaller than 30,000, so the answer is 20,000.

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**93. (B)** First, find the new volume ($V_2$) associated with the changes described in the question (dividing $r$ by 2 and doubling $h$):

$$V_2 = \frac{1}{3}\,\pi \left(\frac{r}{2}\right)^2 (2h) = \frac{1}{3}\,\pi \left(\frac{r^2}{4}\right)(2h) = \frac{1}{6}\,\pi\,r^2 h$$

Now, calculate the ratio between $V_2$ and the original V:

$$V_2 : V$$

$$\frac{1}{6}\,\pi\,r^2 h : \frac{1}{3}\,\pi\,r^2 h$$

Cancel out the like terms:

$$\frac{1}{6} : \frac{1}{3}$$

Finally, multiply both sides by 6 to get rid of the fractions:
1:2

---

**94. (G)** Evaluate each option to determine which expression **must** be positive. Options F and H must be negative, and Options J and K could be either positive or negative. Only Option G **must** be positive, because the addition of a positive number ($z$) and the square of any number ($w^2$) will always be positive.

An alternate way to solve this problem is to assign values to each variable (e.g., $w = {}^-1$ and $z = 1$), and test each answer option.

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**95. (D)** The integer values of $x$ we need to consider are 0, 1, 2, 3, 4, and 5. Plug each of these values into the expression to see whether the result is an integer:

$x = 0 \quad \dfrac{2x + 5}{x - 2} = \dfrac{5}{-2}$, which is not an integer.

$x = 1 \quad \dfrac{2x + 5}{x - 2} = \dfrac{{}^-7}{1} = {}^-7$, which *is* an integer.

$x = 2 \quad \dfrac{2x + 5}{x - 2} = \dfrac{9}{0}$, which is not an integer.

$x = 3 \quad \dfrac{2x + 5}{x - 2} = \dfrac{11}{1} = 11$, which *is* an integer.

$x = 4 \quad \dfrac{2x + 5}{x - 2} = \dfrac{13}{2}$, which is not an integer.

$x = 5 \quad \dfrac{2x + 5}{x - 2} = \dfrac{15}{3} = 5$, which *is* an integer.

Thus, there are 3 integer values of $x$ (1, 3, and 5) that make the expression an integer.

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**96. (K)** First, calculate the midpoint of the first line segment whose points are given:

Midpoint of $x$-value: $\dfrac{6 + 12}{2} = \dfrac{18}{2} = 9$

Midpoint of $y$-value: $\dfrac{8 + 10}{2} = \dfrac{18}{2} = 9$

So, the midpoint of the first line segment is (9, 9).

Now, use that information to find $x$. Set up the midpoint formula for the $x$-value of the second line segment using the two given points:

$$\frac{8 + x}{2} = 9$$

$$8 + x = 18$$

$$x = 10$$

---

**97. (C)** We know that $p$ is a positive even integer less than 11, so the options for $p$ are 2, 4, 6, 8, or 10. The options for $p^2$ are then 4, 16, 36, 64, or 100.

You could check the GCF for each pair ($p^2$, 81), but there is a quicker way to solve this.

We know that $81 = 3 \times 3 \times 3 \times 3$; therefore, the correct $p^2$ option must be divisible by 3. Only $p^2 = 36$ is divisible by 3, so $p = 6$ must be the solution.

**98. (G)** The formula to calculate the measure of an interior angle of a polygon is $\dfrac{180(n-2)}{n}$, where $n$ = the number of sides of the polygon. To solve this problem, substitute $n = 12$ (the number of sides given):

$$\frac{180(12-2)}{12} = \frac{180(10)}{12} = 150°$$

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**99. (D)** Use the mean of $w, x, y$, and $z$ to solve for $w$:

$$\frac{w+x+y+z}{4} = 60$$

$$w+x+y+z = 240$$

$$w = 240 - x - y - z$$

Similarly, use the mean of $v, x, y$, and $z$ to solve for $v$:
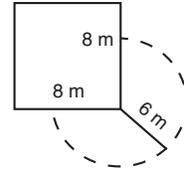
$$\frac{v+x+y+z}{4} = 62$$

$$v+x+y+z = 248$$

$$v = 248 - x - y - z$$

Now, you can solve $v - w$:
$$v - w = (248 - x - y - z) - (240 - x - y - z)$$
$$= 248 - 240$$
$$= 8$$

**100. (H)** It may be helpful to draw a diagram of the shed and the grazing area.



(Notice that the lengths of the sides of the shed are not important to the solution of the problem, except to prevent the goat from walking around a corner.) The resulting grazing area is a circle with radius 6 meters, minus the area of the circle taken by the shed. The shed is square so all of its corners are right angles. Thus the grazing area is $\frac{3}{4}$ of the area of the circle. The area of a circle is $\pi r^2$.

$$\text{Grazing area} = \frac{3}{4} \pi 6^2$$

$$= \frac{3}{4} \pi (36)$$

$$= 27\pi \text{ sq m}$$

## Answer Key for Sample Form A

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