



SECTION 2

SAMPLE QUESTIONS

This section of the Georgia Assessments for the Certification of Educators® (GACE™) Preparation Guide provides sample selected-response questions with an annotated answer key for you to review as part of your preparation for the test. The sample selected-response questions are designed to illustrate the nature of the test questions. Work through the questions carefully before referring to the annotated answer key, which follows the sample selected-response questions. The answer key provides the correct response to each question, describes why each correct response is the best answer, and lists the objective within the test framework to which each question is linked.

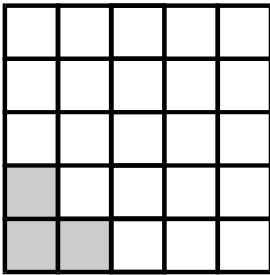
Please note that formulas are provided for this test. Please refer to these formulas as needed in responding to the sample test questions and assignments. The formulas are located in the Assessment Reference Materials section at the end of this preparation guide.

A scientific calculator may be used for this test as needed in responding to the sample test questions and assignments. Please refer to the current GACE registration bulletin for information about the use of calculators at the test administration.

Section 2: Sample Questions

QUESTIONS

- Given that p , q , r , and s are digits and that $p < q < r < s$, which of the following numbers is the largest?
 - $2.\overline{pqrs}$
 - $2.p\overline{qrs}$
 - $2.pqr\overline{s}$
 - $2.pqrss$
- Use the diagram below to answer the question that follows.



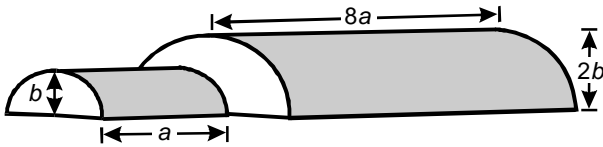
Which of the following decimals is represented by the shaded area of the diagram above?

- 0.03
- 0.06
- 0.12
- 0.15

3. Which of the following is equivalent to the expression $x^6y^3 + (2x^2)^3$?

- A. $x^6(y^3 + 6)$
- B. $x^5(xy^3 + 8)$
- C. $x^5(xy^3 + 2)$
- D. $x^6(y^3 + 8)$

4. Use the diagram below to answer the question that follows.



The storage shed shown above is composed of two half-cylinders. Which of the following formulas represents the shaded roof area?

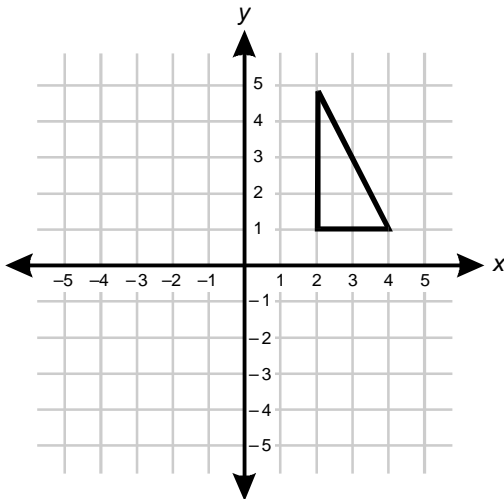
- A. $16.5\pi b^2a$
- B. $17\pi ba$
- C. $33\pi b^2a$
- D. $34\pi ba$

Section 2: Sample Questions

5. Right triangles CAT and DOG are similar. Triangle CAT has a height of 4, a base of b , and an area of 12. Triangle DOG has an area of 48. What is the length of the base of triangle DOG ?

- A. $6\sqrt{2}$
- B. 8
- C. $8\sqrt{2}$
- D. 12

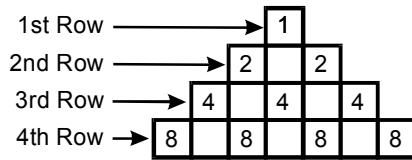
6. Use the graph below to answer the question that follows.



Which of the following sets of coordinates represents a right triangle similar to the one shown above but with 4 times the area?

- A. $(-4, 3)$, $(-4, -13)$, and $(4, -13)$
- B. $(-4, 3)$, $(-4, -5)$, and $(0, -5)$
- C. $(-4, 3)$, $(-4, -13)$, and $(-2, -13)$
- D. $(-4, 3)$, $(-4, -3)$, and $(-1, -3)$

7. Use the figure below to answer the question that follows.



Which of the following expressions could be used to find the sum of the numbers in the n th row?

- A. $2^{n-1} \times 2^{n-1}$
- B. $2^{n-1} \times n$
- C. $2^{n+1} \times 2^{-2n}$
- D. $2^{n+1} \times 2^{-(n+1)}$
8. Use the equation below to answer the question that follows.

$$|-2x + 3| = 9$$

Which of the following statements can be derived from the equation above?

- A. $x = -3$
- B. $x = 3$
- C. $x = -3$ or $x = 3$
- D. $x = -3$ or $x = 6$

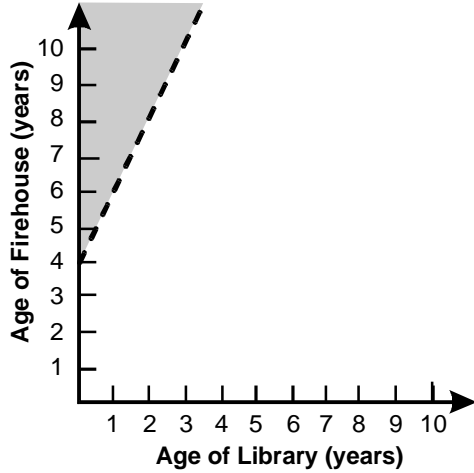
Section 2: Sample Questions

9. Use the information below to answer the question that follows.

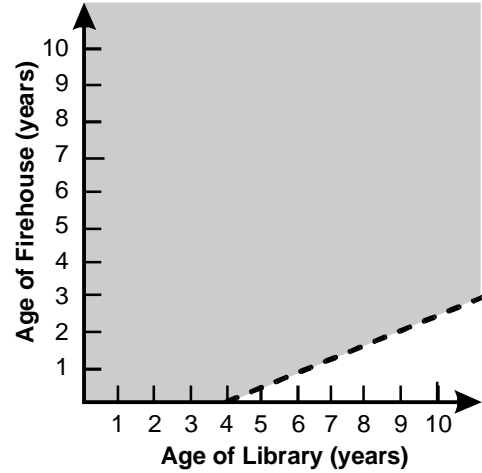
The library is less than half the age of the firehouse 4 years ago.

Which of the following graphs represents the possible ages of the library and the firehouse?

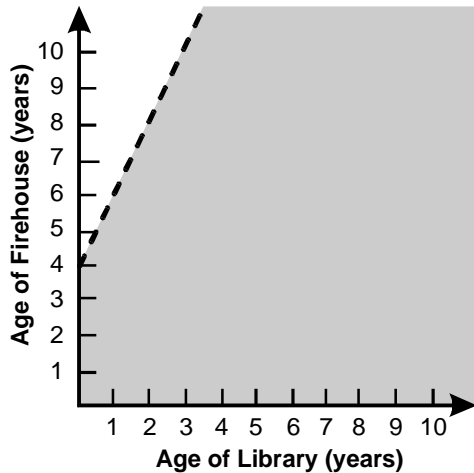
A.



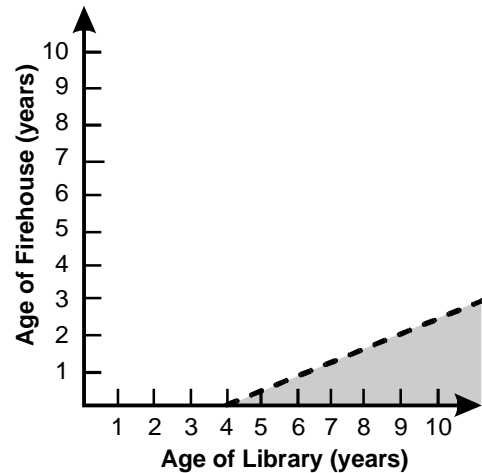
B.



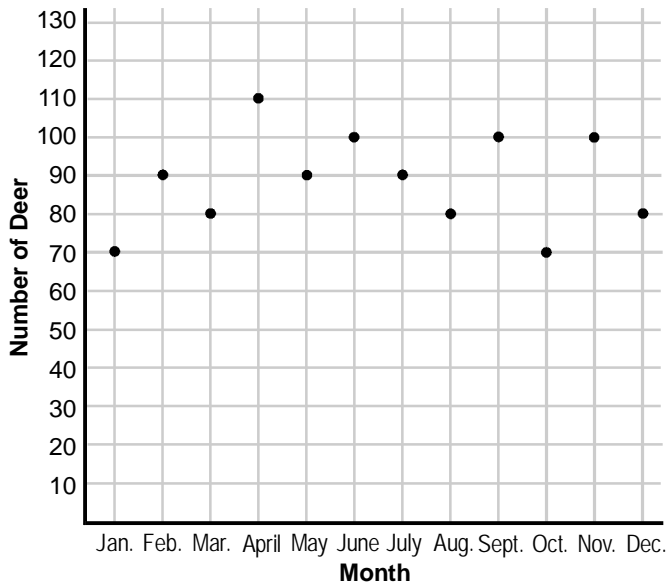
C.



D.



10. Use the scatter plot below to answer the question that follows.

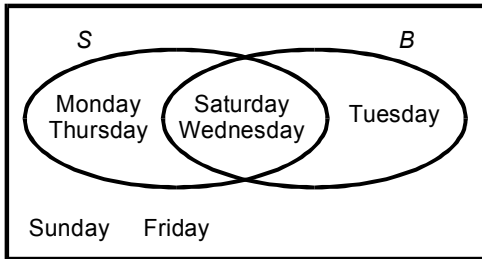


The scatter plot above shows the number of deer that visit a specific grazing site over the course of a year. The relationship between the number of deer that visit the grazing site and the time of year is best described as which of the following?

- A. not linearly correlated
- B. inversely proportional
- C. constant
- D. directly proportional

Section 2: Sample Questions

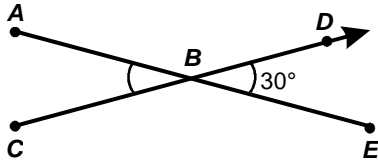
11. Use the diagram below to answer the question that follows.



In the Venn diagram above, S indicates days of the week with soccer practice and B indicates days of the week with ballet practice. Which of the following sets represents the complement of $(S \cup B)$?

- A. Wednesday, Saturday
- B. Monday, Tuesday, Wednesday, Thursday, Saturday
- C. Sunday, Friday
- D. Monday, Tuesday, Thursday

12. Use the diagram below to answer the question that follows.



Which of the following descriptions most accurately represents the diagram above?

- A. Line AE intersects line CD to create adjacent angles ABC and DBE measuring 30° .
- B. Line segment AE intersects ray CD to create vertical angles ABC and DBE measuring 30° .
- C. Line AE intersects ray CD to create vertical angles ABC and DBE measuring 30° .
- D. Line segment AE intersects ray CD to create adjacent angles ABC and DBE measuring 30° .
13. Which of the following is an example of a direct proof showing that, for all values of n , $(2n)^2$ is even?
- A. $(2 \times 1)^2$, $(2 \times 2)^2$, and $(2 \times 3)^2$ are all even. Therefore, $(2 \times n)^2$ is always even.
- B. Given that 2 times any number is even, let $n = 2x$. $(2n)^2 = (2 \times 2x)^2 = 16x^2 = 2(8x^2)$, which is even.
- C. Assume that $(2n)^2$ is odd. $(2n)^2 = 4n^2 = 2(2n^2)$. Since 2 times any number is even, the statement is false.
- D. Given that 2 times any number is even, $(2n)^2 = 4n^2 = 2(2n^2)$, is even.

ANNOTATED ANSWER KEY

For question	The correct response is	Reason	Test Objective
1	C	In the representation of a decimal number, the placement of a bar over one or more adjacent digits means that those digits repeat indefinitely. In response C, s is the repeating digit beginning in the ten-thousandths decimal place and continuing thereafter. Since $s > r > q > p$, $2.pqr\bar{s}$ is the largest of the numbers listed.	0001
2	C	Since there are 25 squares in the grid, the 3 shaded squares represent $\frac{3}{25}$ of the total, and $\frac{3}{25} = \frac{12}{100} = 0.12$.	0002
3	D	The first step in solving this problem is to simplify the expression $(2x^2)^3$ by cubing $2x^2$, or $(2x^2)(2x^2)(2x^2) = 8x^6$ using the laws of exponents. Substituting this into the original expression yields $x^6y^3 + 8x^6$. Factoring out x^6 , the greatest common factor, results in $x^6(y^3 + 8)$.	0003
4	B	The formula for finding the circumference of a circle is $2\pi r$ where r is the radius of the circle. Thus the shaded roof area of the smaller shed can be represented as the product of one half the circumference of the circle with radius = b , and the length a of the shed, i.e., $\frac{1}{2}(2\pi b)a = \pi ba$. Similarly the shaded roof area of the larger shed can be represented as the product of one half the circumference of the circle with radius = $2b$, and the length $8a$ of the shed, i.e., $\frac{1}{2}[(2\pi)(2b)](8a) = \frac{1}{2}(4\pi b)(8a) = (2\pi b)(8a) = 16\pi ba$. The sum of the two shaded areas is equal to the expression $\pi ba + 16\pi ba = 17\pi ba$.	0004

For question	The correct response is	Reason	Test Objective
5	D	The area of triangle CAT can be represented as being equal to $\frac{1}{2}(\text{base})(\text{height})$ or, in this case, $\frac{1}{2}(b)(4) = 2b = 12$. Therefore the base of triangle $CAT = 6$. Since the ratio of the height to the base is 4 to 6, the height $h = \frac{2}{3}b$. Since the two triangles are similar, the same ratio must be true for the relationship between the height and base in triangle DOG as in triangle CAT . Thus in triangle DOG the area = $\frac{1}{2}(\text{base})(\text{height}) = \frac{1}{2}(b)(\frac{2}{3}b) = 48 \Rightarrow \frac{b^2}{3} = 48 \Rightarrow b^2 = 144 \Rightarrow b = 12$.	0005
6	B	The legs of the new right triangle will be twice the lengths of those of the existing right triangle, since a fourfold increase in area requires a doubling in the lengths of the sides. Since the legs of the existing right triangle are 4 and 2, the new right triangle will have legs of lengths 8 and 4. The vertical distance between points $(-4, 3)$ and $(-4, -5)$ is 8, and the horizontal distance between points $(-4, -5)$ and $(0, -5)$ is 4, meeting the specifications for the new right triangle.	0006
7	B	The sums of the numbers in the rows are 1×1 , 2×2 , 4×3 , and 8×4 . These can be rewritten as $2^0 \times 1$, $2^1 \times 2$, $2^2 \times 3$, and $2^3 \times 4$. In each case, the power of 2 is one less than the row number and is multiplied by the row number. Thus the sum of the numbers in row n is $2^{n-1} \times n$.	0007
8	D	The absolute value of $-2x + 3$ is equal to 9 if $-2x + 3 = \pm 9$. If $-2x + 3 = 9$, then $-2x = 6$ and $x = -3$. If $-2x + 3 = -9$, then $-2x = -12$ and $x = 6$. Thus the complete solution set is $x = -3$ or $x = 6$.	0008
9	A	Let L = the age of the library and let F = the current age of the firehouse. Since $F - 4$ is the age of the firehouse 4 years ago, then $L < (\frac{1}{2})(F - 4)$. This implies that $2L < F - 4$ or $F > 2L + 4$, which is shown as the shaded portion of the graph in response A.	0009
10	A	Although the number of deer visiting the site varies, it does not vary in a predictable manner. The number is not decreasing, it is not remaining the same, and it is not increasing. Hence there is no linear correlation between the time of the year and the number of deer grazing.	0010

Section 2: Sample Questions

For question	The correct response is	Reason	Test Objective
11	C	$S \cup B$ is the set that includes all of the days of the week on which soccer practice, ballet practice, or both occur. The complement of $(S \cup B)$ is the set containing the days of the week on which no practices occur, in this case Sunday and Friday.	0011
12	B	A line segment has two endpoints. A ray begins at an endpoint and extends infinitely away from it in one direction. The diagram shows a line segment AE , with endpoints A and E , that intersects a ray with endpoint C that contains point D and continues beyond it. The point of intersection is point B . The marked angles are vertical because they are nonadjacent and formed by two intersecting lines. $m\angle ABC = m\angle DBE = 30^\circ$ because vertical angles are congruent.	0012
13	D	In a direct proof, the given information or premise is stated, and then valid logical arguments are used to arrive directly at the conclusion. In this case the premise is that <i>any</i> number is multiplied by 2 and then squared. The algebraic argument shows that the result must be an even number.	0013