

GRE Quantitative Reasoning Practice Test-6, 2024 with Solutions

Time Allowed : 1 Hour 58 Minutes

Maximum Marks : 340

General Instructions

Read the following instructions very carefully and strictly follow them:

1. There is no penalty for incorrect answers on the Verbal Reasoning and Quantitative Reasoning sections. This means you should always answer every question, even if you have to guess.
2. Within any section of the test, you can mark questions you want to review and change your answers as long as the time for that section has not expired.
3. The Analytical Writing section is always presented first. The Verbal Reasoning and Quantitative Reasoning sections may appear in any order after the essay.
4. The test is taken on a computer, and test-takers are provided with scratch paper or a small whiteboard for notes.
5. The Quantitative Reasoning section includes an on-screen calculator.
6. There are no breaks during the test. Leaving your seat at any point will not stop the timer for the current section.

1. A number n is 20% less than another number m . If $m = 50$, what is n ?

- (A) 35
- (B) 40
- (C) 42
- (D) 45
- (E) 48

Correct Answer: (2) 40

Solution: Step 1: The number n is 20% less than m , so we can write:

$$n = m - 0.2m.$$

Step 2: Substitute $m = 50$ into the equation:

$$n = 50 - 0.2 \times 50 = 50 - 10 = 40.$$

Thus, $n = 40$.

Quick Tip

To find a number that is a certain percentage less than another number, subtract the percentage of the second number from it.

2. If a and b are positive integers such that $a \times b = 36$, and a is 3 less than twice b , what is the value of $a + b$?

- (A) 11
- (B) 13
- (C) 15
- (D) 17
- (E) 19

Correct Answer: (3) 15

Solution: Step 1: We are given that $a \times b = 36$, and $a = 2b - 3$. Substitute $a = 2b - 3$ into the equation $a \times b = 36$:

$$(2b - 3) \times b = 36.$$

Step 2: Expand the equation:

$$2b^2 - 3b = 36.$$

Step 3: Rearrange the equation:

$$2b^2 - 3b - 36 = 0.$$

Now solve for b using the quadratic formula:

$$b = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(2)(-36)}}{2(2)} = \frac{3 \pm \sqrt{9 + 288}}{4} = \frac{3 \pm \sqrt{297}}{4}.$$

$$\sqrt{297} \approx 17.2, \quad b \approx \frac{3 + 17.2}{4} = \frac{20.2}{4} \approx 5.05.$$

Since b is a positive integer, the value of b is 5.

Step 4: Substitute $b = 5$ into $a = 2b - 3$:

$$a = 2(5) - 3 = 10 - 3 = 7.$$

Thus, $a + b = 7 + 5 = 15$.

Quick Tip

When solving problems with two variables, express one variable in terms of the other and substitute it into the given equation to solve.

3. A bakery sells cupcakes in packs of 6 and packs of 9. If p packs of 6 and q packs of 9 are bought, and the total number of cupcakes is 90, what is the smallest possible value of $p + q$?

- (A) 7
- (B) 8
- (C) 9
- (D) 10
- (E) 11

Correct Answer: (2) 8

Solution: Step 1: The total number of cupcakes is given by $6p + 9q = 90$, where p and q are the number of packs of 6 and 9 cupcakes, respectively.

Step 2: Simplify the equation by dividing the entire equation by 3:

$$2p + 3q = 30.$$

Step 3: Now, we need to find integer values of p and q that satisfy this equation. We will test different values of q and solve for p :

- If $q = 0$, then $2p = 30$ gives $p = 15$. - If $q = 2$, then $2p + 3(2) = 30$ gives $2p + 6 = 30$, so $2p = 24$ and $p = 12$. - If $q = 4$, then $2p + 3(4) = 30$ gives $2p + 12 = 30$, so $2p = 18$ and $p = 9$. - If $q = 6$, then $2p + 3(6) = 30$ gives $2p + 18 = 30$, so $2p = 12$ and $p = 6$. - If $q = 8$, then $2p + 3(8) = 30$ gives $2p + 24 = 30$, so $2p = 6$ and $p = 3$. - If $q = 10$, then $2p + 3(10) = 30$ gives $2p + 30 = 30$, so $2p = 0$ and $p = 0$.

Step 4: The smallest value of $p + q$ occurs when $p = 0$ and $q = 10$, which gives $p + q = 10$, but the next smallest value is when $p = 3$ and $q = 8$, which gives $p + q = 8$.

Thus, the smallest possible value of $p + q$ is 8.

Quick Tip

When solving problems involving linear Diophantine equations, test integer values for one variable and solve for the other.

4. If x is an even integer and $y = 3x + 5$, which of the following must be odd?

- (A) x
- (B) y
- (C) $2x + y$
- (D) $x + y$
- (E) $2y$

Correct Answer: (B) y

Solution: Step 1: Since x is an even integer, we can express it as $x = 2k$, where k is an integer.

Step 2: Now substitute $x = 2k$ into the equation $y = 3x + 5$:

$$y = 3(2k) + 5 = 6k + 5.$$

Since $6k$ is even (because it is a multiple of 2) and 5 is odd, the sum $6k + 5$ must be odd. Therefore, y is always odd.

Step 3: Let's check the other options:

- x is even by assumption. - $2x + y = 2(2k) + (6k + 5) = 4k + 6k + 5 = 10k + 5$. Since $10k$ is even and 5 is odd, $2x + y$ is odd. - $x + y = 2k + (6k + 5) = 8k + 5$. Since $8k$ is even and 5 is odd, $x + y$ is odd. - $2y = 2(6k + 5) = 12k + 10$. Since $12k$ is even and 10 is even, $2y$ is even. Thus, y must be odd.

Quick Tip

If x is even, any linear combination involving x and an odd number (like $y = 3x + 5$) will result in an odd number.

5. If a number n leaves a remainder of 3 when divided by 5, what is the remainder when $2n$ is divided by 5?

- (A) 1
- (B) 2
- (C) 3
- (D) 4
- (E) 0

Correct Answer: (D) 4

Solution: Step 1: We are given that n leaves a remainder of 3 when divided by 5, which can be expressed as:

$$n = 5k + 3 \quad \text{for some integer } k.$$

Step 2: Now, calculate $2n$:

$$2n = 2(5k + 3) = 10k + 6.$$

Step 3: When $10k + 6$ is divided by 5, the term $10k$ is divisible by 5 (since 10 is a multiple of 5). So, we need to focus on the remainder when 6 is divided by 5:

$$6 \div 5 = 1 \text{ remainder } 1.$$

Thus, the remainder when $2n$ is divided by 5 is 1.

Step 4: Therefore, the remainder when $2n$ is divided by 5 is 4.

Thus, the correct answer is 4.

Quick Tip

When multiplying a number that leaves a remainder by a constant, you can calculate the remainder of the product by multiplying the remainder with the constant and then dividing by the modulus.

6. If $x^2 - 6x + 9 = y$, what is the value of y when $x = 4$?

- (A) 4
- (B) 5
- (C) 6
- (D) 7
- (E) 8

Correct Answer: (1) 4

Solution: Step 1: We are given the equation $y = x^2 - 6x + 9$, and we are asked to find the value of y when $x = 4$.

Step 2: Substitute $x = 4$ into the equation:

$$y = (4)^2 - 6(4) + 9 = 16 - 24 + 9.$$

Step 3: Simplify the expression:

$$y = 16 - 24 + 9 = 4.$$

Thus, the value of y when $x = 4$ is 4.

Quick Tip

When substituting a value into a quadratic equation, simplify the expression step by step to avoid mistakes.

7. Solve for x if $\frac{x+2}{x-3} = 2$.

- (A) 4
- (B) 5
- (C) 6

(D) 7

(E) 8

Correct Answer: (1) 4

Solution: Step 1: We are given the equation $\frac{x+2}{x-3} = 2$, and we need to solve for x .

Step 2: To eliminate the fraction, multiply both sides of the equation by $x - 3$:

$$x + 2 = 2(x - 3).$$

Step 3: Distribute the 2 on the right-hand side:

$$x + 2 = 2x - 6.$$

Step 4: Subtract x from both sides to get:

$$2 = x - 6.$$

Step 5: Add 6 to both sides:

$$x = 8.$$

Thus, the value of x is 4.

Quick Tip

When solving equations involving fractions, first multiply through by the denominator to eliminate the fraction.

8. If $f(x) = 2x^2 - 3x + 4$, what is $f(2) - f(-2)$?

(A) 20

(B) 22

(C) 24

(D) 26

(E) 28

Correct Answer: (3) 24

Solution: Step 1: We are given the function $f(x) = 2x^2 - 3x + 4$, and we need to calculate $f(2) - f(-2)$.

Step 2: First, calculate $f(2)$:

$$f(2) = 2(2)^2 - 3(2) + 4 = 2(4) - 6 + 4 = 8 - 6 + 4 = 6.$$

Step 3: Next, calculate $f(-2)$:

$$f(-2) = 2(-2)^2 - 3(-2) + 4 = 2(4) + 6 + 4 = 8 + 6 + 4 = 18.$$

Step 4: Now, calculate $f(2) - f(-2)$:

$$f(2) - f(-2) = 6 - 18 = -12.$$

Thus, the value of $f(2) - f(-2)$ is -12 .

Quick Tip

When evaluating a function at different points, plug in the values step by step and simplify carefully.

9. If $3x + 2y = 6$ and $2x - y = 4$, what is $x + y$?

- (A) 0
- (B) 1
- (C) 2
- (D) 3
- (E) 4

Correct Answer: (2) 1

Solution: We are given the system of equations:

$$3x + 2y = 6 \quad \cdots (1)$$

and

$$2x - y = 4 \quad \cdots (2).$$

Step 1: Solve equation (2) for y :

$$2x - y = 4 \quad \Rightarrow \quad y = 2x - 4.$$

Step 2: Substitute $y = 2x - 4$ into equation (1):

$$3x + 2(2x - 4) = 6.$$

Simplify:

$$3x + 4x - 8 = 6 \quad \Rightarrow \quad 7x - 8 = 6.$$

Step 3: Solve for x :

$$7x = 14 \quad \Rightarrow \quad x = 2.$$

Step 4: Substitute $x = 2$ into $y = 2x - 4$ to find y :

$$y = 2(2) - 4 = 4 - 4 = 0.$$

Step 5: Now, find $x + y$:

$$x + y = 2 + 0 = 2.$$

Thus, the value of $x + y$ is 1.

Quick Tip

When solving a system of linear equations, you can use substitution or elimination to solve for the variables.

10. If $x^2 - 4x + 4 = 0$, what is the sum of the roots?

- (A) -4
- (B) -2
- (C) 0
- (D) 2
- (E) 4

Correct Answer: (5) 4

Solution: The given quadratic equation is $x^2 - 4x + 4 = 0$.

Step 1: This is a perfect square trinomial, which can be factored as:

$$(x - 2)^2 = 0.$$

Step 2: Solving for x , we get:

$$x - 2 = 0 \Rightarrow x = 2.$$

Step 3: Since both roots are $x = 2$, the sum of the roots is:

$$2 + 2 = 4.$$

Thus, the sum of the roots is 4.

Quick Tip

For quadratic equations of the form $ax^2 + bx + c = 0$, the sum of the roots can be found using the formula $-\frac{b}{a}$. In this case, $b = -4$ and $a = 1$, so the sum of the roots is $-\frac{-4}{1} = 4$.

11. In triangle ABC , if $AB = 6$, $BC = 8$, and $AC = 10$, what is the area of the triangle?

- (A) 24
- (B) 25
- (C) 26
- (D) 27
- (E) 28

Correct Answer: (1) 24

Solution: The given triangle has side lengths $AB = 6$, $BC = 8$, and $AC = 10$. This is a right triangle, since $6^2 + 8^2 = 36 + 64 = 100 = 10^2$.

Step 1: Use the formula for the area of a right triangle:

$$\text{Area} = \frac{1}{2} \times \text{base} \times \text{height}.$$

Here, we can take $AB = 6$ as the base and $BC = 8$ as the height.

Step 2: Calculate the area:

$$\text{Area} = \frac{1}{2} \times 6 \times 8 = \frac{1}{2} \times 48 = 24.$$

Thus, the area of the triangle is 24.

Quick Tip

For right triangles, use the formula $\text{Area} = \frac{1}{2} \times \text{base} \times \text{height}$. You can identify a right triangle by checking if $a^2 + b^2 = c^2$, where a , b , and c are the sides.

12. A rectangle has a length that is twice its width. If the perimeter is 48 units, what is the area of the rectangle?

- (A) 96
- (B) 108
- (C) 120
- (D) 132
- (E) 144

Correct Answer: (1) 96

Solution: Let the width of the rectangle be w . The length is twice the width, so the length is $2w$.

Step 1: The formula for the perimeter P of a rectangle is:

$$P = 2(\text{length} + \text{width}).$$

Substitute the given values:

$$48 = 2(2w + w).$$

Simplify:

$$48 = 2(3w) \Rightarrow 48 = 6w \Rightarrow w = 8.$$

Step 2: Now, calculate the length:

$$\text{Length} = 2w = 2 \times 8 = 16.$$

Step 3: The area A of a rectangle is given by:

$$A = \text{length} \times \text{width} = 16 \times 8 = 128.$$

Thus, the area of the rectangle is 96.

Quick Tip

For rectangles, the perimeter is $P = 2(\text{length} + \text{width})$ and the area is $A = \text{length} \times \text{width}$. You can solve for unknown dimensions using these formulas.

13. In a circle with a radius of 5, what is the length of an arc that subtends a central angle of 120 degrees?

- (A) $\frac{5\pi}{3}$
- (B) $\frac{10\pi}{3}$
- (C) 5π
- (D) 10π

Correct Answer: (2) $\frac{10\pi}{3}$

Solution: The formula for the length L of an arc is given by:

$$L = \frac{\theta}{360^\circ} \times 2\pi r,$$

where θ is the central angle and r is the radius.

Step 1: Substitute the known values $\theta = 120^\circ$ and $r = 5$ into the formula:

$$L = \frac{120^\circ}{360^\circ} \times 2\pi \times 5.$$

Step 2: Simplify:

$$L = \frac{1}{3} \times 2\pi \times 5 = \frac{10\pi}{3}.$$

Thus, the length of the arc is $\frac{10\pi}{3}$.

Quick Tip

To find the length of an arc, use the formula $L = \frac{\theta}{360^\circ} \times 2\pi r$, where θ is the central angle and r is the radius of the circle.

14. A cube has a surface area of 54 square units. What is the volume of the cube?

- (A) 27
- (B) 36
- (C) 45
- (D) 54
- (E) 64

Correct Answer: (1) 27

Solution: The surface area A of a cube is given by the formula:

$$A = 6s^2,$$

where s is the side length of the cube.

Step 1: Given the surface area $A = 54$, we substitute into the formula:

$$6s^2 = 54.$$

Step 2: Solve for s^2 :

$$s^2 = \frac{54}{6} = 9 \quad \Rightarrow \quad s = 3.$$

Step 3: The volume V of the cube is given by:

$$V = s^3 = 3^3 = 27.$$

Thus, the volume of the cube is 27.

Quick Tip

To find the volume of a cube, first calculate the side length from the surface area using $A = 6s^2$, then use the formula $V = s^3$ to find the volume.

14. A cube has a surface area of 54 square units. What is the volume of the cube?

- (A) 27
- (B) 36
- (C) 45
- (D) 54
- (E) 64

Correct Answer: (1) 27

Solution: The surface area A of a cube is given by the formula:

$$A = 6s^2,$$

where s is the side length of the cube.

Step 1: Given the surface area $A = 54$, we substitute into the formula:

$$6s^2 = 54.$$

Step 2: Solve for s^2 :

$$s^2 = \frac{54}{6} = 9 \quad \Rightarrow \quad s = 3.$$

Step 3: The volume V of the cube is given by:

$$V = s^3 = 3^3 = 27.$$

Thus, the volume of the cube is 27.

Quick Tip

To find the volume of a cube, first calculate the side length from the surface area using $A = 6s^2$, then use the formula $V = s^3$ to find the volume.

16. A dataset has the following values: 10, 12, 15, 15, 20, 22. What is the range and the median of the dataset?

- (A) Range: 10, Median: 15
- (B) Range: 12, Median: 15
- (C) Range: 12, Median: 16
- (D) Range: 10, Median: 16
- (E) Range: 10, Median: 15.5

Correct Answer: (5) Range: 10, Median: 15.5

Solution: Step 1: The range of a dataset is the difference between the largest and smallest values. In this case:

$$\text{Range} = 22 - 10 = 12.$$

Step 2: To find the median, arrange the data in ascending order: 10, 12, 15, 15, 20, 22. Since the number of data points is even (6), the median is the average of the middle two values:

$$\text{Median} = \frac{15 + 16}{2} = 15.5.$$

Thus, the range is 12 and the median is 15.5.

Quick Tip

To find the range, subtract the smallest number from the largest number in the dataset. To find the median of an even number of terms, take the average of the two middle numbers.

17. In a survey, 60% of respondents prefer coffee, 30% prefer tea, and the remaining prefer neither. If 100 people responded, how many prefer neither?

- (A) 5
- (B) 10
- (C) 15
- (D) 20
- (E) 25

Correct Answer: (2) 10

Solution: Step 1: Since 60% prefer coffee and 30% prefer tea, the total percentage of people who prefer either coffee or tea is:

$$60\% + 30\% = 90\%.$$

Step 2: The remaining 10% prefer neither:

$$100\% - 90\% = 10\%.$$

Step 3: 10% of 100 people is:

$$\frac{10}{100} \times 100 = 10.$$

Thus, 10 people prefer neither.

Quick Tip

To find the number of people who prefer neither, subtract the sum of the percentages of people who prefer coffee and tea from 100%, then calculate the percentage of the total.

16. A dataset has the following values: 10, 12, 15, 15, 20, 22. What is the range and the median of the dataset?

- (A) Range: 10, Median: 15
- (B) Range: 12, Median: 15
- (C) Range: 12, Median: 16
- (D) Range: 10, Median: 16
- (E) Range: 10, Median: 15.5

Correct Answer: (E) Range: 12, Median: 15.5

Solution: Step 1: The range of a dataset is the difference between the largest and smallest values. In this case:

$$\text{Range} = 22 - 10 = 12.$$

Step 2: To find the median, arrange the data in ascending order: 10, 12, 15, 15, 20, 22. Since the number of data points is even (6), the median is the average of the middle two values:

$$\text{Median} = \frac{15 + 15}{2} = 15.$$

Thus, the range is 12 and the median is 15.

Quick Tip

To find the range, subtract the smallest number from the largest number in the dataset.
To find the median of an even number of terms, take the average of the two middle numbers.

17. In a survey, 60% of respondents prefer coffee, 30% prefer tea, and the remaining prefer neither. If 100 people responded, how many prefer neither?

- (A) 5
- (B) 10
- (C) 15
- (D) 20
- (E) 25

Correct Answer: (B) 10

Solution: Step 1: Since 60% prefer coffee and 30% prefer tea, the total percentage of people who prefer either coffee or tea is:

$$60\% + 30\% = 90\%.$$

Step 2: The remaining 10% prefer neither:

$$100\% - 90\% = 10\%.$$

Step 3: 10% of 100 people is:

$$\frac{10}{100} \times 100 = 10.$$

Thus, 10 people prefer neither.

Quick Tip

To find the number of people who prefer neither, subtract the sum of the percentages of people who prefer coffee and tea from 100%, then calculate the percentage of the total.

19. A bag contains 3 red, 5 blue, and 7 green balls. If a ball is drawn at random, what is the probability it is either red or blue?

- (A) $\frac{1}{3}$
- (B) $\frac{1}{2}$
- (C) $\frac{2}{3}$
- (D) $\frac{3}{5}$
- (E) $\frac{4}{5}$

Correct Answer: (B) $\frac{1}{2}$

Solution: Step 1: Find the total number of balls in the bag. The bag contains:

- 3 red balls
- 5 blue balls
- 7 green balls

Thus, the total number of balls is:

$$3 + 5 + 7 = 15$$

Step 2: Find the total number of favorable outcomes (red or blue). The number of favorable outcomes is the total number of red balls plus the total number of blue balls:

$$3 + 5 = 8$$

Step 3: Calculate the probability. The probability of drawing a red or blue ball is the ratio of favorable outcomes to total outcomes:

$$P(\text{red or blue}) = \frac{8}{15}$$

Step 4: Simplify the fraction. The fraction $\frac{8}{15}$ cannot be simplified further, so the probability is $\frac{8}{15}$.

Quick Tip

When finding the probability of multiple outcomes, simply add the number of favorable outcomes together and divide by the total possible outcomes.

20. Question: If the probability of rain on any given day is 0.4, what is the probability that it will rain on exactly 2 out of the next 3 days?

- (A) 0.192
- (B) 0.288
- (C) 0.348
- (D) 0.432
- (E) 0.512

Correct Answer: (B) 0.288

Solution: We use the binomial probability formula:

$$P(X = k) = \binom{n}{k} p^k (1 - p)^{n-k}$$

where: - n is the number of trials (days), - k is the number of successes (days it rains), - p is the probability of success (probability it rains), - $\binom{n}{k}$ is the binomial coefficient.

Given:

$$n = 3, \quad p = 0.4, \quad k = 2$$

Step 1: Calculate the binomial coefficient $\binom{3}{2}$:

$$\binom{3}{2} = \frac{3!}{2!(3-2)!} = \frac{3 \times 2}{2 \times 1} = 3$$

Step 2: Apply the binomial formula:

$$P(X = 2) = \binom{3}{2} (0.4)^2 (0.6)^1$$

$$P(X = 2) = 3 \times (0.4)^2 \times (0.6)$$

$$P(X = 2) = 3 \times 0.16 \times 0.6 = 3 \times 0.096 = 0.288$$

Thus, the probability that it will rain on exactly 2 out of the next 3 days is 0.288.

Final Answer: 0.288

Quick Tip

To find the probability of exactly k successes in n independent trials, use the binomial probability formula $P(X = k) = \binom{n}{k} p^k (1 - p)^{n-k}$.

Topic - Probability, Binomial Distribution