

GRE Quantitative Reasoning Practice Test-3, 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. If $\frac{3}{5}x - 2 = 1$, what is x ?

- (A) 3
- (B) 4
- (C) 5
- (D) 6

Correct Answer: (3) 5

Solution:

Add 2 to both sides:

$$\begin{aligned}\frac{3}{5}x + 2 - 2 &= 5 - 2 \\ \frac{3}{5}x &= 3\end{aligned}$$

Now multiply both sides by $\frac{5}{3}$:

$$\begin{aligned}\frac{5}{3} \times \frac{3}{5} \times x &= \frac{5}{3} \times 3 \\ x &= \frac{5}{3} \times 3 = 5\end{aligned}$$

Thus, the solution is $x = 5$.

Quick Tip

When solving for a variable in an equation with fractions, first clear the fraction by multiplying both sides by the reciprocal of the fraction.

2. What is the sum of the first 20 positive integers?

- (A) 190
- (B) 200
- (C) 210
- (D) 220

Correct Answer: (3) 210

Solution:

The formula for the sum of the first n positive integers is:

$$S_n = \frac{n(n+1)}{2}.$$

This formula is derived by pairing the first and last terms of the sequence, the second and second-to-last terms, and so on. Each pair sums to $n+1$. Since there are $\frac{n}{2}$ pairs, we multiply by $n+1$ and divide by 2.

Now, for $n = 20$, we substitute into the formula:

$$S_{20} = \frac{20(20+1)}{2}.$$

Simplify the expression:

$$S_{20} = \frac{20 \times 21}{2}.$$

First, multiply 20×21 :

$$S_{20} = \frac{420}{2}.$$

Now, divide by 2:

$$S_{20} = 210.$$

Thus, the sum of the first 20 positive integers is:

$$\boxed{210}.$$

Quick Tip

The sum of the first n integers can be found using the formula $\frac{n(n+1)}{2}$.

3. Solve for y : $y^2 - 9 = 0$.

- (A) $y = 3$
- (B) $y = -3$
- (C) $y = 0$
- (D) No solution

Correct Answer: (1) $y = 3$ or (2) $y = -3$

Solution:

We are asked to solve the quadratic equation:

$$y^2 - 9 = 0.$$

This equation can be factored as a difference of squares. Recall the formula for factoring a difference of squares:

$$a^2 - b^2 = (a - b)(a + b).$$

Applying this to the equation $y^2 - 9$, we recognize that it is in the form of $a^2 - b^2$ where $a = y$ and $b = 3$. Therefore, we can factor the equation as:

$$(y - 3)(y + 3) = 0.$$

Next, to solve for y , we set each factor equal to zero:

$$y - 3 = 0 \quad \text{or} \quad y + 3 = 0.$$

Solving each equation:

- From $y - 3 = 0$, we add 3 to both sides to get:

$$y = 3.$$

- From $y + 3 = 0$, we subtract 3 from both sides to get:

$$y = -3.$$

Thus, the two possible solutions are:

$$y = 3 \quad \text{or} \quad y = -3.$$

Therefore, the solution to the equation is $y = 3$ or $y = -3$.

Quick Tip

When solving quadratic equations that can be factored, set each factor equal to zero to find the possible solutions.

4. If $f(x) = x^3 - 4x + 1$, find $f(-2)$.

- (A) 3
- (B) 1
- (C) -1
- (D) 0

Correct Answer: (2) 1

Solution:

We are given the function $f(x) = x^3 - 4x + 1$ and asked to find $f(-2)$.

To evaluate the function at $x = -2$, we substitute -2 for x in the expression for $f(x)$:

$$f(-2) = (-2)^3 - 4(-2) + 1.$$

Now, calculate each term:

1. $(-2)^3 = -8$, 2. $-4(-2) = 8$, 3. The constant term is 1.

Thus, we have:

$$f(-2) = -8 + 8 + 1.$$

Finally, simplify the expression:

$$f(-2) = 1.$$

Therefore, the value of $f(-2)$ is 1.

Quick Tip

When evaluating functions for specific values, simply substitute the value of x into the function and perform the arithmetic operations.

5. What is the volume of a rectangular prism with length 5 cm, width 3 cm, and height 4 cm?

- (A) 50 cm^3
- (B) 60 cm^3
- (C) 70 cm^3
- (D) 80 cm^3

Correct Answer: (2) 60 cm^3

Solution:

We are asked to find the volume of a rectangular prism. The formula for the volume of a rectangular prism is:

$$\text{Volume} = \text{length} \times \text{width} \times \text{height}.$$

In this problem, the given dimensions are: - Length = 5 units, - Width = 3 units, - Height = 4 units.

Substitute the values into the formula:

$$\text{Volume} = 5 \times 3 \times 4.$$

Now, calculate the product:

$$5 \times 3 = 15, \quad \text{and} \quad 15 \times 4 = 60.$$

Therefore, the volume of the rectangular prism is 60 cubic units.

Quick Tip

The volume of a rectangular prism is simply the product of its length, width, and height. Be sure to use the correct units and square/cube them appropriately.

6. Find the area of a trapezoid with bases of 6 cm and 10 cm, and height of 4 cm.

- (A) 24 cm^2
- (B) 28 cm^2
- (C) 32 cm^2
- (D) 36 cm^2

Correct Answer: (3) 32 cm^2

Solution:

We are asked to find the area of a trapezoid. The formula for the area of a trapezoid is:

$$\text{Area} = \frac{1}{2} \times (\text{base}_1 + \text{base}_2) \times \text{height}.$$

In this problem, the given values are: - Base 1 (base_1) = 6 cm, - Base 2 (base_2) = 10 cm, - Height (height) = 4 cm.

Substitute the values into the formula:

$$\text{Area} = \frac{1}{2} \times (6 + 10) \times 4.$$

Simplify the expression:

$$\text{Area} = \frac{1}{2} \times 16 \times 4.$$

First, multiply the bases:

$$6 + 10 = 16.$$

Now, calculate:

$$\frac{1}{2} \times 16 = 8,$$

and then multiply by the height:

$$8 \times 4 = 32.$$

Thus, the area of the trapezoid is:

$$\boxed{32 \text{ cm}^2}.$$

Quick Tip

The area of a trapezoid is given by the average of the two bases multiplied by the height. Always double-check your calculation of the bases and height!

7. A dataset contains the numbers 4, 6, 8, 10, and 12. What is the mean?

- (A) 6
- (B) 7
- (C) 8
- (D) 9

Correct Answer: (C) 8

Solution:

We are asked to find the mean of the given set of numbers. The mean is calculated by adding up all the numbers in the set and dividing the sum by the total number of values.

The given set of numbers is:

$$4, 6, 8, 10, 12.$$

1. ****Step 1: Calculate the Sum of the Numbers**** Add all the numbers together:

$$4 + 6 + 8 + 10 + 12 = 40.$$

2. ****Step 2: Divide by the Number of Values**** There are 5 numbers in the set, so divide the sum by 5:

$$\text{Mean} = \frac{40}{5} = 8.$$

Thus, the mean of the set of numbers is:

$$\boxed{8}.$$

Quick Tip

The mean is simply the sum of the numbers divided by the total count of values in the dataset. It's a helpful measure of central tendency.

8. In a survey, 70% of respondents preferred product A over product B. If 140 people preferred product A, how many people were surveyed in total?

- (A) 180
- (B) 190
- (C) 200
- (D) 210

Correct Answer: (C) 200

Solution:

Let x be the total number of people surveyed. The problem states that 70% of the respondents preferred product A. This means that 70% of x equals 140. We can represent this relationship with the equation:

$$0.7x = 140.$$

1. **Step 1: Solve for x** To isolate x , divide both sides of the equation by 0.7:

$$x = \frac{140}{0.7}.$$

2. **Step 2: Perform the Division** Calculate the value of x :

$$x = \frac{140}{0.7} = 200.$$

Thus, the total number of people surveyed is:

$$\boxed{200}.$$

Quick Tip

To solve percentage problems, set up an equation where the percentage is multiplied by the total amount (represented by x) to equal the known quantity. Then solve for x .

9. Simplify the expression $4(x - 3) + 5$.

- (A) $4x - 6$
- (B) $4x - 7$
- (C) $4x - 8$
- (D) $4x + 7$

Correct Answer: (B) $4x - 7$

Solution:

We are given the expression $4(x - 3) + 5$ and are asked to simplify it. Let's break it down step by step.

1. **Distribute the 4**: To begin simplifying the expression, distribute the 4 to both terms inside the parentheses:

$$4(x - 3) + 5 = 4x - 12 + 5.$$

Here, we multiply 4 by both x and -3 , which results in $4x$ and -12 , respectively.

2. ****Combine the constants****: Now, combine the constants -12 and 5 on the right-hand side:

$$4x - 12 + 5 = 4x - 7.$$

Adding -12 and 5 gives -7 .

Thus, the simplified expression is:

$$4x - 7.$$

Quick Tip

When distributing a constant to terms inside parentheses, make sure to multiply the constant by each term individually. Then simplify the expression by combining like terms.

10. If x is inversely proportional to y and $x = 8$ when $y = 2$, what is x when $y = 4$?

- (A) 2
- (B) 4
- (C) 8
- (D) 16

Correct Answer: (B) 4

Solution:

Since x is inversely proportional to y , we know the relationship can be expressed as:

$$x \times y = k,$$

where k is a constant.

1. *Given values*: We are given that $x = 8$ and $y = 2$. Using these values, we can find the constant k . Substitute the known values into the equation:

$$8 \times 2 = 16 \quad \Rightarrow \quad k = 16.$$

Thus, the constant k is 16.

2. *Find x for a new value of y* : Now, we are asked to find the value of x when $y = 4$. Using the equation $x \times y = k$, we substitute $y = 4$ and $k = 16$ into the equation:

$$x \times 4 = 16 \quad \Rightarrow \quad x = \frac{16}{4} = 4.$$

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

Quick Tip

When variables are inversely proportional, their product remains constant. You can use this property to solve for unknown values by setting up an equation and solving for the unknown.

11. Solve for x if $3x + 2 = 14$.

- (A) 2
- (B) 4
- (C) 6

(D) 8

Correct Answer: (B) 4

Solution:

We start with the given equation:

$$3x + 2 = 14$$

1. *Step 1: Subtract 2 from both sides:* To isolate the term with x , we subtract 2 from both sides of the equation:

$$3x = 14 - 2$$

Simplifying the right-hand side:

$$3x = 12$$

2. *Step 2: Divide both sides by 3:* To solve for x , divide both sides of the equation by 3:

$$x = \frac{12}{3}$$

Simplifying:

$$x = 4$$

Thus, the solution is $x = 4$.

Quick Tip

To isolate the variable in a linear equation, use inverse operations (addition, subtraction, multiplication, and division) to simplify and solve for the unknown.

12. A right triangle has legs of length 9 cm and 12 cm. What is the length of the hypotenuse?

- (A) 12 cm
- (B) 13 cm
- (C) 14 cm
- (D) 15 cm

Correct Answer: (D) 15 cm

Solution: To find the length of the hypotenuse in a right triangle, we use the Pythagorean theorem:

$$a^2 + b^2 = c^2$$

where a and b are the lengths of the legs, and c is the length of the hypotenuse. Substituting the given values:

$$9^2 + 12^2 = c^2$$

$$81 + 144 = c^2$$

$$225 = c^2$$

Taking the square root of both sides:

$$c = \sqrt{225} = 15$$

Quick Tip

For right triangles, the Pythagorean theorem allows you to find the length of the hypotenuse by squaring the lengths of the legs, adding them together, and taking the square root of the sum.

1. If a car travels 300 miles in 5 hours, what is the average speed in miles per hour?

- (A) 50 miles per hour
- (B) 60 miles per hour
- (C) 70 miles per hour
- (D) 75 miles per hour

Correct Answer: (B) 60 miles per hour

Solution: To find the average speed, we use the formula:

$$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}}$$

Substituting the given values:

$$\text{Average speed} = \frac{300 \text{ miles}}{5 \text{ hours}} = 60 \text{ miles per hour}$$

Quick Tip

The average speed is calculated by dividing the total distance traveled by the total time taken.

2. If $\frac{7}{4}x = 8$, what is x ?

- (A) 6
- (B) 10
- (C) 12
- (D) 14

Correct Answer: (D) $x = 14$

Solution: To solve for x , multiply both sides of the equation by $\frac{4}{7}$:

$$x = 8 \times \frac{4}{7} = \frac{32}{7} = 14$$

Quick Tip

To isolate x , multiply both sides of the equation by the reciprocal of the fraction.

3. What is the least common multiple (LCM) of 12 and 15?

- (A) 30
- (B) 45
- (C) 60
- (D) 90

Correct Answer: (C) 60

Solution: First, find the prime factorizations of 12 and 15:

$$12 = 2^2 \times 3, \quad 15 = 3 \times 5$$

The LCM is the product of the highest powers of all prime factors:

$$\text{LCM} = 2^2 \times 3 \times 5 = 60$$

Quick Tip

To find the LCM, take the highest power of each prime factor and multiply them.

4. Solve for x :

$$x^2 - 6x + 9 = 0$$

(A) $x = -3$

(B) $x = 3$

(C) $x = 0$

(D) $x = 6$

Correct Answer: (B) $x = 3$

Solution: Factor the quadratic equation:

$$x^2 - 6x + 9 = (x - 3)^2 = 0$$

Now, set the factor equal to zero:

$$x - 3 = 0$$

Solving for x , we get:

$$x = 3$$

Quick Tip

A perfect square trinomial can be factored as $(x - a)^2$.

5. If

$$g(x) = 2x^2 - 5x + 3, \text{ find } g(2).$$

(A) 0

(B) 1

(C) -1

(D) 2

Correct Answer: (B) 1

Solution: Substitute $x = 2$ into the function:

$$g(2) = 2(2)^2 - 5(2) + 3$$

First, calculate the powers and products:

$$g(2) = 2(4) - 10 + 3$$

$$g(2) = 8 - 10 + 3 = 1$$

Final Answer: $g(2) = 1$

Quick Tip

For a quadratic function $g(x) = ax^2 + bx + c$, substitute x directly into the equation to find $g(x)$.

6. What is the area of a circle with a diameter of 10 cm?

(Use $\pi \approx 3.14$)

- (A) 78.5 cm^2
- (B) 50 cm^2
- (C) 31.4 cm^2
- (D) 25 cm^2

Correct Answer: (A) 78.5 cm^2

Solution: The radius r is half of the diameter:

$$r = \frac{10}{2} = 5 \text{ cm}$$

Now, use the formula for the area of a circle:

$$\text{Area} = \pi r^2$$

Substitute the known values:

$$\text{Area} = 3.14 \times 5^2 = 3.14 \times 25 = 78.5 \text{ cm}^2$$

Final Answer: 78.5 cm^2

Quick Tip

To find the area of a circle, use the formula $A = \pi r^2$, where r is the radius, and $\pi \approx 3.14$.

7. Find the surface area of a cube with side length 4 cm.

- (A) 96 cm^2
- (B) 64 cm^2
- (C) 80 cm^2
- (D) 100 cm^2

Correct Answer: (A) 96 cm^2

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

$$\text{Surface Area} = 6a^2$$

where a is the length of one side. Given that the side length $a = 4 \text{ cm}$, we substitute this into the formula:

$$\text{Surface Area} = 6 \times 4^2 = 6 \times 16 = 96 \text{ cm}^2$$

Final Answer: 96 cm^2

Quick Tip

To find the surface area of a cube, use the formula $SA = 6a^2$, where a is the length of one side.

8. A dataset contains the numbers 12, 15, 18, 20, and 25. What is the range?

- (A) 13
- (B) 15
- (C) 18
- (D) 10

Correct Answer: (A) 13

Solution: The range of a dataset is found by subtracting the smallest number from the largest number:

$$\text{Range} = \text{Max Value} - \text{Min Value}$$

Here, the largest value is 25 and the smallest value is 12:

$$\text{Range} = 25 - 12 = 13$$

Final Answer: 13

Quick Tip

The range of a dataset is the difference between the largest and smallest values.

9. A company's sales increased from \$1,500,000 to \$2,000,000 in one year. What was the percentage increase?

- (A) 25%
- (B) 33.33%
- (C) 40%
- (D) 50%

Correct Answer: (B) 33.33%

Solution: Use the formula for percentage increase:

$$\text{Percentage Increase} = \frac{\text{New Value} - \text{Old Value}}{\text{Old Value}} \times 100$$

Substitute the given values:

$$\text{Percentage Increase} = \frac{2,000,000 - 1,500,000}{1,500,000} \times 100 = \frac{500,000}{1,500,000} \times 100 = 33.33\%$$

Final Answer: 33.33%

Quick Tip

To find the percentage increase, subtract the old value from the new value, divide by the old value, and then multiply by 100.

10. Simplify the expression: $(3x - 2)(2x + 5)$

Solution: Use the distributive property (FOIL method):

$$(3x - 2)(2x + 5) = 3x \cdot 2x + 3x \cdot 5 - 2 \cdot 2x - 2 \cdot 5$$

Simplify the terms:

$$= 6x^2 + 15x - 4x - 10$$

Combine like terms:

$$= 6x^2 + 11x - 10$$

Final Answer: $6x^2 + 11x - 10$

11. Solve for z if $4z - 7 = 3z + 5$.

Solution: Subtract $3z$ from both sides:

$$4z - 7 - 3z = 3z + 5 - 3z$$

$$z - 7 = 5$$

Next, add 7 to both sides:

$$z - 7 + 7 = 5 + 7$$

$$z = 12$$

Final Answer: $z = 12$

12. What is the value of x in the equation $2(x + 3) = 5x - 4$?

Solution: Distribute the 2 and then solve for x :

$$2(x + 3) = 5x - 4$$

$$2x + 6 = 5x - 4$$

Next, move terms with x to one side and constants to the other:

$$6 + 4 = 5x - 2x$$

$$10 = 3x$$

Now, divide by 3:

$$x = \frac{10}{3}$$

Final Answer: $x = \frac{10}{3}$

13. If the probability of an event occurring is 0.25, what is the probability that the event does not occur?

Solution: The probability of an event not occurring is given by:

$$1 - (\text{probability of the event occurring})$$

Substitute the given probability:

$$1 - 0.25 = 0.75$$

Final Answer: 0.75

14. Find the median of the dataset: 8, 12, 15, 22, 26, 29.

Solution: The median is the middle value in an ordered list. For an even number of values, it is the average of the two middle values. First, arrange the numbers in order:

$$8, 12, 15, 22, 26, 29$$

The two middle values are 15 and 22. Now, calculate the average:

$$\frac{15 + 22}{2} = 18.5$$

Final Answer: 18.5

15. What is the standard deviation of the dataset: 3, 7, 7, 8, 10, 15?

Solution: To find the standard deviation, follow these steps:

Step 1: Find the mean:

$$\frac{3 + 7 + 7 + 8 + 10 + 15}{6} = 8.33$$

Step 2: Calculate each value's deviation from the mean, square it, and sum the squared deviations:

$$\begin{aligned}\text{Variance} &= \frac{(3 - 8.33)^2 + (7 - 8.33)^2 + (7 - 8.33)^2 + (8 - 8.33)^2 + (10 - 8.33)^2 + (15 - 8.33)^2}{6} \\ &= \frac{28.69 + 1.77 + 1.77 + 0.11 + 2.77 + 43.36}{6} = 13.0\end{aligned}$$

Step 3: Take the square root of the variance:

$$\text{Standard Deviation} = \sqrt{13.08} \approx 3.62$$

Final Answer: Approximately 3.62