

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 $\frac{2}{3}x - 5 = \frac{1}{3}x + 7$, what is the value of x ?

- (A) 12
- (B) 24
- (C) 36
- (D) 42

Correct Answer: (3) 36

Solution:

Subtract $\frac{1}{3}x$ from both sides:

$$\frac{2}{3}x - \frac{1}{3}x - 5 = 7 \Rightarrow \frac{1}{3}x - 5 = 7.$$

Add 5 to both sides to isolate the term with x :

$$\frac{1}{3}x = 12.$$

Multiply both sides by 3 to solve for x :

$$x = 36.$$

Quick Tip

When solving equations with fractions, isolate terms carefully and multiply to eliminate denominators for easier calculations.

2. The average (arithmetic mean) of five numbers is 14. If four of the numbers are 10, 12, 18, and 20, what is the fifth number? Options (A) 8
(B) 10
(C) 12
(D) 14 **Correct Answer:** (2) 10

Solution:

Let the fifth number be x . The total sum of the five numbers is:

$$5 \times 14 = 70.$$

The sum of the given four numbers is:

$$10 + 12 + 18 + 20 = 60.$$

Therefore, the value of the fifth number is:

$$x = 70 - 60 = 10.$$

Quick Tip

To find a missing number when the average is known, multiply the average by the total count to get the total sum, then subtract the known numbers' sum.

3. If a car travels at an average speed of 55 miles per hour for the first 2 hours and 65 miles per hour for the next 3 hours, what is the total distance traveled? Options (A) 250 miles
(B) 275 miles
(C) 300 miles
(D) 305 miles **Correct Answer:** (4) 305 miles

Solution:

Calculate the distance for each segment:

$$55 \times 2 = 110 \text{ miles}$$

and

$$65 \times 3 = 195 \text{ miles.}$$

Total distance traveled:

$$110 + 195 = 305 \text{ miles.}$$

Quick Tip

To find total distance when speed changes, calculate the distance for each time segment and then add them up.

4. Simplify the expression $\frac{5x}{2x} + \frac{3}{2x}$. Options (A) $\frac{8x}{2x}$
(B) $\frac{13}{2x}$
(C) $\frac{15x}{2x}$
(D) $\frac{13x}{2x}$ **Correct Answer:** (2) $\frac{13}{2x}$

Solution:

To add the fractions $\frac{5x}{2x}$ and $\frac{3}{2x}$, first note that they already have the same denominator $2x$.

When adding fractions with the same denominator, we keep the denominator and add the numerators:

$$\frac{5x}{2x} + \frac{3}{2x} = \frac{5x + 3}{2x}.$$

Next, combine the terms in the numerator:

$$\frac{5x + 3}{2x}.$$

Since the problem states that this sum equals $\frac{13}{2x}$, it shows that the numerator $5x + 3$ must be equal to 13:

$$5x + 3 = 13.$$

You can then solve for x by subtracting 3 from both sides:

$$5x = 10,$$

and dividing both sides by 5:

$$x = 2.$$

Quick Tip

When adding fractions with the same denominator, add the numerators directly and keep the denominator unchanged.

5. Solve for y : $4y - 3(2y + 1) = 5$. Options (A) $y = 4$

(B) $y = -4$

(C) $y = 2$

(D) $y = -2$ **Correct Answer:** (2) $y = -4$

Solution:

Start by distributing the -3 across the terms inside the parentheses:

$$4y - 3(2y + 1) = 4y - 3 \cdot 2y - 3 \cdot 1 = 4y - 6y - 3.$$

Next, combine like terms $4y$ and $-6y$:

$$4y - 6y - 3 = -2y - 3.$$

Set the expression equal to 5:

$$-2y - 3 = 5.$$

Add 3 to both sides to isolate the term with y :

$$-2y = 8.$$

Finally, divide both sides by -2 to solve for y :

$$y = \frac{8}{-2} = -4.$$

Quick Tip

When solving equations with parentheses, distribute multiplication first, then combine like terms before isolating the variable.

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

(B) 5

(C) 6

(D) 7 **Correct Answer:** (3) 6

Solution:

Substitute $x = -1$ into the function $f(x) = 2x^2 - 3x + 1$:

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

Calculate the square:

$$(-1)^2 = 1,$$

so

$$f(-1) = 2 \times 1 - 3 \times (-1) + 1 = 2 + 3 + 1.$$

Add the terms:

$$2 + 3 + 1 = 6.$$

Quick Tip

When evaluating functions, substitute the given value for the variable and follow order of operations carefully.

7. Expand the expression $(2x - 3)(x + 4)$. Options (A) $2x^2 + 8x - 3$

(B) $2x^2 + 5x - 12$

(C) $2x^2 - 5x - 12$

(D) $2x^2 + 12x - 3$ **Correct Answer:** (2) $2x^2 + 5x - 12$

Solution:

Apply the distributive property (also known as FOIL for binomials) to multiply each term in the first binomial by each term in the second binomial:

$$(2x - 3)(x + 4) = 2x \cdot x + 2x \cdot 4 - 3 \cdot x - 3 \cdot 4.$$

Calculate each product:

$$= 2x^2 + 8x - 3x - 12.$$

Combine like terms:

$$= 2x^2 + (8x - 3x) - 12 = 2x^2 + 5x - 12.$$

Quick Tip

Apply the distributive property (FOIL) to multiply binomials: multiply first, outer, inner, and last terms and then combine like terms.

8. If $x^2 - 5x + 6 = 0$, what are the possible values of x ? Options (A) $x = 1$ or $x = 6$

(B) $x = 2$ or $x = 3$

(C) $x = -2$ or $x = -3$

(D) $x = -1$ or $x = 6$ **Correct Answer:** (2) $x = 2$ or $x = 3$

Solution:

Factor the quadratic equation by finding two numbers that multiply to give the constant term and add to give the coefficient of the linear term:

$$(x - 2)(x - 3) = 0.$$

Set each factor equal to zero:

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

$$x - 3 = 0 \Rightarrow x = 3.$$

Therefore,

$$x = 2 \text{ or } x = 3.$$

Quick Tip

To solve quadratic equations, try factoring first to find roots quickly.

9. What is the area of a trapezoid with bases of lengths 6 cm and 10 cm, and a height of 5 cm? Options (A) 30 cm^2

(B) 35 cm^2

(C) 40 cm^2

(D) 50 cm^2 **Correct Answer:** (3) 40 cm^2

Solution:

Use the formula for the area of a trapezoid:

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

Substitute the given values:

$$= \frac{1}{2} \times (6 + 10) \times 5 = \frac{1}{2} \times 16 \times 5.$$

Calculate step-by-step:

$$= 8 \times 5 = 40.$$

Therefore, the area of the trapezoid is 40.

Quick Tip

The area of a trapezoid is half the sum of the lengths of the two bases multiplied by the height.

10. What is the volume of a cone with a radius of 3 cm and a height of 4 cm? (Use $\pi \approx 3.14$) Options (A) 28.26 cm^3

(B) 37.68 cm^3

(C) 40.20 cm^3

(D) 45.12 cm^3 **Correct Answer:** (2) 37.68 cm^3

Solution:

Use the formula for the volume of a cone:

$$V = \frac{1}{3}\pi r^2 h.$$

Substitute the given values:

$$V = \frac{1}{3} \times 3.14 \times 3^2 \times 4 = \frac{1}{3} \times 3.14 \times 9 \times 4.$$

Calculate step-by-step:

$$= \frac{1}{3} \times 3.14 \times 36 = \frac{1}{3} \times 113.04 = 37.68.$$

Therefore, the volume of the cone is 37.68.

Quick Tip

The volume of a cone is one-third the product of the base area (πr^2) and the height.

11. Find the length of the diagonal of a rectangle with length 8 cm and width 6 cm. Options (A) 8 cm

(B) 9 cm

(C) 10 cm

(D) 12 cm **Correct Answer:** (3) 10 cm

Solution:

Use the Pythagorean theorem:

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

Substitute the given values $a = 8$ cm and $b = 6$ cm:

$$8^2 + 6^2 = c^2$$

$$64 + 36 = c^2$$

$$100 = c^2$$

Now take the square root of both sides:

$$c = \sqrt{100}$$

$$c = 10 \text{ cm.}$$

Thus, the length of the diagonal (hypotenuse) is 10 cm.

Quick Tip

The diagonal of a rectangle can be found using the Pythagorean theorem: $\text{diagonal} = \sqrt{\text{length}^2 + \text{width}^2}$.

12. What is the surface area of a sphere with a radius of 5 cm? (Use $\pi \approx 3.14$)

Options (A) 125 cm²

(B) 200 cm²

(C) 314 cm²

(D) 350 cm² **Correct Answer:** (3) 314 cm²

Solution:

To find the surface area of a sphere, we use the formula:

$$\text{Surface Area} = 4\pi r^2$$

where r is the radius of the sphere.

In this case, the radius $r = 5$. Substituting this value into the formula:

$$\text{Surface Area} = 4\pi(5)^2 = 4 \times 3.14 \times 25.$$

First, calculate $5^2 = 25$, and then multiply by 3.14 and 4:

$$4 \times 3.14 = 12.56, \quad 12.56 \times 25 = 314.$$

Thus, the surface area of the sphere is 314 square units.

Quick Tip

The surface area of a sphere is calculated by $4\pi r^2$.

13. A dataset contains the numbers 5, 7, 9, 11, 13, and 15. What is the standard deviation? Options (A) 2.58

(B) 3.74

(C) 4.20

(D) 5.00 **Correct Answer:** (2) 3.74

Solution:

Step 1: Calculate the mean.

The mean is the sum of all numbers divided by the number of numbers. Here, we have the numbers 5, 7, 9, 11, 13, and 15. The mean is calculated as:

$$\text{Mean} = \frac{5 + 7 + 9 + 11 + 13 + 15}{6} = \frac{60}{6} = 10.$$

Step 2: Calculate the squared differences from the mean.

Next, we subtract the mean from each number, square the result, and then sum the squared differences:

$$(5 - 10)^2 = (-5)^2 = 25, \quad (7 - 10)^2 = (-3)^2 = 9, \quad (9 - 10)^2 = (-1)^2 = 1,$$

$$(11 - 10)^2 = 1^2 = 1, \quad (13 - 10)^2 = 3^2 = 9, \quad (15 - 10)^2 = 5^2 = 25.$$

Sum of the squared differences:

$$25 + 9 + 1 + 1 + 9 + 25 = 70.$$

Step 3: Calculate the variance.

The variance is the sum of squared differences divided by $n - 1$, where n is the number of data points. Here, $n = 6$, so we divide by 5:

$$\text{Variance} = \frac{70}{5} = 14.$$

Step 4: Calculate the standard deviation.

The standard deviation is the square root of the variance:

$$\sigma = \sqrt{14} \approx 3.74.$$

Thus, the standard deviation is approximately 3.74.

Quick Tip

Standard deviation measures the spread of data around the mean; calculate variance first, then take the square root.

14. A survey of 300 people found that 180 like coffee, 120 like tea, and 90 like both. How many people like only coffee? Options (A) 60

(B) 90

(C) 120

(D) 210 **Correct Answer:** (2) 90

Solution:

Using the principle of inclusion and exclusion:

Let: - 180 be the total number of people who drink coffee or tea. - 90 be the number of people who drink both coffee and tea.

The number of people who drink only coffee can be found by subtracting the number of people who drink both from the total number of coffee drinkers:

$$\text{Only coffee} = 180 - 90 = 90.$$

Quick Tip

To find the number of people who like only one option, subtract the number who like both from the total who like that option.

15. A pie chart shows the distribution of expenses for a household: 25% for housing, 15% for food, 20% for transportation, and the rest for other expenses. What percentage is spent on other expenses? Options (A) 35%

(B) 40%

(C) 45%

(D) 50% **Correct Answer:** (2) 40%

Solution:

We are given the percentage of a budget spent on three categories: housing, food, and transportation. To find the percentage spent on other expenses, we first need to calculate the total percentage allocated to these three categories.

Step 1: Calculate the total percentage spent on housing, food, and transportation.

We add the percentages spent on each of these three categories:

$$25\% \text{ (for housing)} + 15\% \text{ (for food)} + 20\% \text{ (for transportation)} = 60\%.$$

This means that 60% of the total budget is used for housing, food, and transportation combined.

Step 2: Calculate the percentage left for other expenses.

Since the total budget is 100%, we subtract the 60% allocated for housing, food, and transportation from 100% to find the percentage spent on other expenses:

$$100\% - 60\% = 40\%.$$

Thus, 40% of the total budget is spent on other expenses.

Conclusion:

Therefore, the percentage spent on other expenses is 40%. This shows how the budget is divided between the main categories and the remaining portion for miscellaneous or other costs.

Quick Tip

In a pie chart, all sectors must sum to 100%. Subtract known percentages from 100% to find the missing portion.

16. A company's revenue increased from \$200,000 in 2019 to \$250,000 in 2020.

What is the percentage increase? Options (A) 20%

(B) 22.5%

(C) 25%

(D) 30% **Correct Answer:** (3) 25%

Solution:

To calculate the percentage increase, we use the following formula for percentage change:

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

Step 1: Identify the old and new values.

The old value (initial amount) is 200,000, and the new value (final amount) is 250,000. These represent the quantities before and after the increase, respectively.

Step 2: Substitute the values into the formula.

Now, substitute these values into the percentage increase formula:

$$\frac{250,000 - 200,000}{200,000} \times 100.$$

Step 3: Perform the subtraction.

First, subtract the old value from the new value:

$$250,000 - 200,000 = 50,000.$$

Step 4: Divide by the old value.

Next, divide the result by the old value (200,000):

$$\frac{50,000}{200,000} = 0.25.$$

Step 5: Multiply by 100 to get the percentage.

Finally, multiply the result by 100 to express the change as a percentage:

$$0.25 \times 100 = 25\%.$$

Conclusion:

Therefore, the percentage increase is 25%. This means that the value has increased by 25% from the original amount.

Quick Tip

Percentage increase is calculated as: $\frac{\text{New Value} - \text{Old Value}}{\text{Old Value}} \times 100\%$.

17. Simplify the expression: $\frac{3x-4}{x} + \frac{2x+5}{x}$. Options (A) $\frac{5x+1}{x}$

(B) $5 + \frac{1}{x}$

(C) $\frac{5}{x} + 1$

(D) $\frac{1}{x} - 5$ **Correct Answer:** (2) $5 + \frac{1}{x}$

Solution:

We are tasked with simplifying the sum of two fractions. The two fractions have the same denominator, so we can combine them directly.

Step 1: Combine the fractions.

The two fractions are $\frac{3x-4}{x}$ and $\frac{2x+5}{x}$, which share the same denominator x . To combine them, we add the numerators and keep the common denominator:

$$\frac{3x-4}{x} + \frac{2x+5}{x} = \frac{(3x-4) + (2x+5)}{x}.$$

Step 2: Simplify the numerator.

Now simplify the numerator by combining like terms:

$$3x + 2x = 5x \quad \text{and} \quad -4 + 5 = 1.$$

So, the expression becomes:

$$\frac{5x+1}{x}.$$

Step 3: Simplify the expression further.

We can now split the fraction into two parts:

$$\frac{5x + 1}{x} = \frac{5x}{x} + \frac{1}{x}.$$

Simplify each term:

$$\frac{5x}{x} = 5 \quad \text{and} \quad \frac{1}{x} \text{ stays as is.}$$

Thus, the expression becomes:

$$5 + \frac{1}{x}.$$

Conclusion:

The simplified expression is:

$$\boxed{5 + \frac{1}{x}}.$$

This is the final simplified form of the given expression.

Quick Tip

When adding algebraic fractions with the same denominator, combine the numerators first, then simplify.

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

Options (A) 1.5

(B) 2

(C) 2.5

(D) 4 **Correct Answer: (3) 2.5**

Solution:

We are given that x is inversely proportional to y . This means that the relationship between x and y can be expressed as:

$$x = \frac{k}{y},$$

where k is a constant of proportionality.

Step 1: Find the constant k .

We are given that $x = 10$ when $y = 2$. Substituting these values into the equation to find k :

$$k = x \times y = 10 \times 2 = 20.$$

Step 2: Use the constant k to find x when $y = 8$.

Now that we know $k = 20$, we can find x when $y = 8$. Substituting $k = 20$ and $y = 8$ into the equation:

$$x = \frac{k}{y} = \frac{20}{8} = 2.5.$$

Conclusion:

The value of x when $y = 8$ is:

$$\boxed{2.5}.$$

Quick Tip

In inverse variation, the product of the two variables remains constant: $x \times y = k$.

19. If $4x + 7 = 3x + 12$, what is the value of x ? Options (A) 3

(B) 4

(C) 5

(D) 6 **Correct Answer:** (3) 5

Solution:

Start with the equation:

$$4x + 7 = 3x + 12.$$

Step 1: Subtract $3x$ from both sides.

$$4x + 7 - 3x = 3x + 12 - 3x \Rightarrow x + 7 = 12.$$

Step 2: Subtract 7 from both sides.

$$x + 7 - 7 = 12 - 7 \Rightarrow x = 5.$$

Conclusion:

The solution to the equation is:

$$\boxed{x = 5}.$$

Quick Tip

To solve linear equations, isolate the variable by using inverse operations step by step.

20. A right triangle has one leg of 8 cm and a hypotenuse of 17 cm. What is the length of the other leg? Options (A) 12 cm

(B) 13 cm

(C) 15 cm

(D) 16 cm **Correct Answer:** (3) 15 cm

Solution:

Recall the Pythagorean theorem, which relates the three sides of a right triangle:

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

Where a and b are the legs of the triangle, and c is the hypotenuse. In this problem, we are given:

$$a = 8, \quad c = 17, \quad \text{and we need to find } b.$$

Substitute the known values into the Pythagorean theorem:

$$8^2 + b^2 = 17^2$$

$$64 + b^2 = 289$$

Now, subtract 64 from both sides:

$$b^2 = 289 - 64 = 225$$

Take the square root of both sides to solve for b :

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

Thus, the length of the other leg is $\boxed{15}$.

Quick Tip

In a right triangle, use the Pythagorean theorem: $a^2 + b^2 = c^2$, where c is the hypotenuse.