GRE Quantitative Reasoning Practice Test-7, 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.

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1. If x is a positive integer and $3x - 7 < 2x + 5$, what is the greatest possible value of x?
(A) 6
(B) 8
(C) 10
(D) 12
(E) 14

Correct Answer: (2) 8
Solution:
We are given the inequality:

$$3x - 7 < 2x + 5$$

First, subtract $2x$ from both sides to isolate x on the left-hand side:

$$3x - 7 - 2x < 2x + 5 - 2x$$

Simplifying the equation:

$$x - 7 < 5$$

Next, add 7 to both sides to further isolate x:

$$x - 7 + 7 < 5 + 7$$

Simplifying:

$$x < 12$$

Since x is a positive integer, the greatest possible value of x is 8.
Quick Tip: When solving inequalities, always perform the same operation on both sides of the inequality. Be cautious of sign changes when multiplying or dividing by negative numbers, as that will flip the inequality sign.

Quick Tip

For inequalities involving integers, always consider the greatest integer less than or equal to the boundary values.

2. A bakery makes 120 cookies, which are divided equally among 4 boxes. Each box is sold for $15. What is the price per cookie?
(A) $0.25
(B) $0.50
(C) $1.00
(D) $1.25
(E) $1.50

Correct Answer: (2) $0.50
Solution:
The total number of cookies is 120, and these are divided equally among 4 boxes. So, the number of cookies per box is:

$$\frac{120}{4} = 30 \text{ cookies per box.}$$

Next, each box is sold for $15, so the price per cookie is:

$$\frac{15}{30} = 0.50 \text{ dollars per cookie.}$$

Conclusion: The price per cookie is 0.50 dollars.

Quick Tip

When dividing total cost by the number of items, remember to break down the total cost per group first (if needed), then calculate the unit price.

3. A number is decreased by 40% and the result is 72. What was the original number?
(A) 100
(B) 120
(C) 150
(D) 160
(E) 180

Correct Answer: (4) 160
Solution:

Let the original number be x. If the number is decreased by 40%, 60% of the original number remains. Therefore, we can set up the equation:

$$0.60x = 72$$

Now, solve for x:

$$x = \frac{72}{0.60} = 120$$

Conclusion: The original number is $\boxed{120}$.

Quick Tip

For percentage decrease problems, use the formula:

$$\text{New value} = \left(1 - \frac{\text{percentage decrease}}{100}\right) \times \text{Original value}.$$

4. If the average (arithmetic mean) of five consecutive integers is 25, what is the largest of these integers?
(A) 25
(B) 26
(C) 27
(D) 28
(E) 29

Correct Answer: (3) 27
Solution:
Let the five consecutive integers be $x-2, x-1, x, x+1, x+2$, where x is the middle integer. The average (mean) of these integers is given by:

$$\frac{(x-2)+(x-1)+x+(x+1)+(x+2)}{5} = 25.$$

Simplify the numerator:

$$\frac{(x-2)+(x-1)+x+(x+1)+(x+2)}{5} = \frac{5x}{5}.$$

Thus, we have:

$$\frac{5x}{5} = 25.$$

Now, solve for x:

$$x = 25.$$

Therefore, the five consecutive integers are $23, 24, 25, 26, 27$, and the largest integer is $\boxed{27}$.

Quick Tip

For consecutive integers, the average is always the middle number. The largest integer will be the middle number plus half of the total number of integers minus one.

5. A certain job pays \$24 per hour for the first 40 hours worked in a week and 1.5 times that rate for any additional hours. If an employee earns \$1,260 in one week, how many total hours did they work?

(A) 45
(B) 47
(C) 48
(D) 50
(E) 52

Correct Answer: (3) 48
Solution:
The employee is paid \$24 per hour for the first 40 hours, so the earnings for these 40 hours are:

$$40 \times 24 = 960.$$

The total earnings are \$1,260, so the remaining earnings come from the additional hours worked:

$$1260 - 960 = 300.$$

The rate for the additional hours is 1.5 times the normal rate, or:

$$1.5 \times 24 = 36 \text{ dollars per hour.}$$

Let the number of additional hours worked be h. The earnings from these hours are:

$$h \times 36 = 300.$$

Now, solve for h:

$$h = \frac{300}{36} = 8.33.$$

Therefore, the total number of hours worked is:

$$40 + 8.33 = 48 \text{ hours.}$$

Thus, the employee worked a total of $\boxed{48}$ hours.

Quick Tip

For overtime pay problems, first calculate the regular earnings, then use the overtime rate for the additional hours to solve for the total time worked.

6. Solve for x:

$$\frac{2}{x} + \frac{3}{x} = \frac{10}{15}$$

(A) 3
(B) 6
(C) 9
(D) 12
(E) 15

Correct Answer: (3) 9
Solution:
The given equation is:

$$\frac{2}{x} + \frac{3}{x} = \frac{10}{15}.$$

Simplify the left side by combining the fractions:

$$\frac{2+3}{x} = \frac{10}{15} \quad \Rightarrow \quad \frac{5}{x} = \frac{2}{3}.$$

Now, cross-multiply:

$$5 \times 3 = 2 \times x \quad \Rightarrow \quad 15 = 2x.$$

Finally, solve for x:

$$x = \frac{15}{2} = 7.5.$$

Thus, the value of x is $\boxed{7.5}$.

Quick Tip

For equations involving fractions, simplify and cross-multiply to eliminate the fractions.

7. If $x^2 - 9 = 16$, what are the values of x?
(A) ± 5
(B) ± 7
(C) ± 6
(D) ± 4
(E) ± 3

Correct Answer: (1) ± 5
Solution:
The given equation is:

$$x^2 - 9 = 16.$$

First, add 9 to both sides of the equation to isolate x^2:

$$x^2 = 16 + 9 = 25.$$

Next, take the square root of both sides to solve for x:

$$x = \pm\sqrt{25} = \pm 5.$$

Thus, the two possible solutions for x are:

$$x = 5 \quad \text{or} \quad x = -5.$$

Quick Tip

When solving equations like $x^2 = a$, remember to account for both the positive and negative square roots.

8. Solve for y in terms of x if $4x - 5y = 20$.
(A) $y = \frac{4x-20}{5}$
(B) $y = \frac{20-4x}{5}$
(C) $y = \frac{5x-20}{4}$
(D) $y = \frac{20+4x}{5}$
(E) $y = \frac{20+5x}{4}$

Correct Answer: (2) $y = \frac{20-4x}{5}$
Solution:
The given equation is:

$$4x - 5y = 20.$$

To solve for y, first subtract $4x$ from both sides:

$$-5y = 20 - 4x.$$

Next, divide both sides by -5 to isolate y:

$$y = \frac{20 - 4x}{-5}.$$

Finally, simplify the fraction:

$$y = \frac{20 - 4x}{5}.$$

Thus, the solution for y is:

$$y = \frac{20 - 4x}{5}.$$

Quick Tip

When solving for a variable, isolate it by first moving all other terms to the opposite side of the equation, then simplify and solve.

9. If $x + 1 = 3(x - 2)$, what is the value of x?
(A) 1
(B) 2
(C) 3
(D) 4
(E) 5

Correct Answer: (4) 4
Solution:
The given equation is:

$$x + 1 = 3(x - 2).$$

First, expand the right-hand side:

$$x + 1 = 3x - 6.$$

Next, subtract x from both sides to move all terms involving x to the right-hand side:

$$1 = 2x - 6.$$

Now, add 6 to both sides to isolate the term with x:

$$7 = 2x.$$

Finally, divide both sides by 2 to solve for x:

$$x = \frac{7}{2}.$$

Thus, the solution is:

$$x = \frac{7}{2}.$$

Quick Tip

When solving linear equations, always simplify by expanding and combining like terms, then isolate the variable.

10. For what value of k will the system of equations $2x + 3y = 12$ and $4x + ky = 24$ have no solution?

(A) 3
(B) 6
(C) 9
(D) 12
(E) 15

Correct Answer: (2) 6

Solution:

For the system of equations to have no solution, the two lines must be parallel. This occurs when the coefficients of x and y in both equations are proportional.

The first equation is:

$$2x + 3y = 12.$$

The second equation is:

$$4x + ky = 24.$$

To find the condition for no solution, we compare the ratios of the coefficients of x and y in both equations. The coefficients of x in the two equations are 2 and 4, and the coefficients of y are 3 and k.

For the lines to be parallel, the ratios of the coefficients of x and y must be equal. Therefore, we set up the equation:

$$\frac{2}{4} = \frac{3}{k}.$$

Simplifying the left-hand side:

$$\frac{1}{2} = \frac{3}{k}.$$

Now, cross-multiply to solve for k:

$$1 \times k = 2 \times 3 \quad \Rightarrow \quad k = 6.$$

Thus, the value of k that makes the two lines parallel, and thus ensures no solution for the system of equations, is:

$$k = 6.$$

Quick Tip

For a system of linear equations to have no solution, the lines represented by the equations must be parallel. This happens when the ratios of the coefficients of x and y are equal but the constants are not.

11. A rectangle has a width of 6 units and a perimeter of 32 units. What is the length of the rectangle?
(A) 8
(B) 10
(C) 12
(D) 14
(E) 16

Correct Answer: (2) 10
Solution:
The perimeter P of a rectangle is given by the formula:

$$P = 2 \times (\text{Length} + \text{Width}).$$

We are told that the perimeter is 32 units, and the width is 6 units. Let the length be denoted by L. Substituting the known values into the perimeter formula:

$$32 = 2 \times (L + 6).$$

Now, to simplify the equation, divide both sides by 2:

$$\frac{32}{2} = \frac{2 \times (L + 6)}{2} \quad \Rightarrow \quad 16 = L + 6.$$

Next, subtract 6 from both sides to solve for L:

$$16 - 6 = L \quad \Rightarrow \quad L = 10.$$

Thus, the length of the rectangle is $\boxed{10}$ units.

Quick Tip

For perimeter problems, remember that the formula $P = 2(L + W)$ relates the perimeter to the length and width of a rectangle. Isolate the unknown variable to solve for it.

12. In a circle with a radius of 10, what is the area of a sector with a central angle of 72 degrees?
(A) 20π
(B) 25π
(C) 50π
(D) 100π
(E) 200π

Correct Answer: (2) 25π
Solution:
The formula for the area of a sector of a circle is:

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

where θ is the central angle (in degrees) and r is the radius of the circle.
We are given:

$$r = 10 \quad \text{and} \quad \theta = 72^\circ.$$

Substitute these values into the formula for the area of the sector:

$$A = \frac{72}{360} \times \pi \times 10^2.$$

Simplify the fraction $\frac{72}{360}$:

$$\frac{72}{360} = \frac{1}{5}.$$

Now, substitute this into the equation:

$$A = \frac{1}{5} \times \pi \times 100.$$

Simplify further:

$$A = 20\pi.$$

Thus, the area of the sector is $\boxed{20\pi}$ square units.

Quick Tip

For sectors, the area is proportional to the fraction of the full circle, given by $\frac{\theta}{360^\circ}$. Don't forget to square the radius when using the area formula.

13. A right triangle has legs of lengths 8 and 15. What is the length of the hypotenuse?
(A) 16
(B) 17
(C) 18
(D) 19
(E) 20

Correct Answer: (2) 17
Solution:
To find the length of the hypotenuse c of 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 hypotenuse.
We are given that:

$$a = 8 \quad \text{and} \quad b = 15.$$

Substitute these values into the Pythagorean theorem:

$$8^2 + 15^2 = c^2.$$

Now, square the values of a and b:

$$64 + 225 = c^2.$$

Add the results:

$$289 = c^2.$$

Now, take the square root of both sides:

$$c = \sqrt{289} = 17.$$

Thus, the length of the hypotenuse is $c = 17$.

Quick Tip

The Pythagorean theorem is a quick way to find the hypotenuse in a right triangle: $a^2 + b^2 = c^2$. Just make sure to square the legs first, then take the square root to solve for c.

14. What is the volume of a cube with a surface area of 54 square units?
(A) 18
(B) 27
(C) 36
(D) 45
(E) 64

Correct Answer: (2) 27
Solution:
The surface area A of a cube is given by the formula:

$$A = 6s^2,$$

where s is the length of a side of the cube.
We are told the surface area is 54 square units, so we have:

$$6s^2 = 54.$$

Now, divide both sides by 6:

$$s^2 = 9.$$

Take the square root of both sides:

$$s = 3.$$

The volume V of a cube is given by the formula:

$$V = s^3.$$

Substitute $s = 3$ into the volume formula:

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

Thus, the volume of the cube is $V = 27$ cubic units.

Quick Tip

For a cube, remember the formulas for surface area $A = 6s^2$ and volume $V = s^3$. Once you find the side length, you can easily calculate the volume.

15. In a parallelogram, if one angle measures 70 degrees, what is the measure of an adjacent angle?
(A) 70
(B) 90
(C) 100
(D) 110

(E) 120

Correct Answer: (4) 110
Solution:
In a parallelogram, adjacent angles are supplementary, meaning they add up to 180°.
If one angle measures 70°, the adjacent angle will be:

$$180^\circ - 70^\circ = 110^\circ.$$

Thus, the adjacent angle is 110°.

Quick Tip

In a parallelogram, adjacent angles are always supplementary (add up to 180 degrees). Use this property to find the measure of an adjacent angle when one is given.

16. The weights of 5 dogs are 10, 12, 15, 15, and 20 pounds. What is the median weight?
(A) 12
(B) 13
(C) 15
(D) 16
(E) 17

Correct Answer: (3) 15
Solution:
The median is the middle value in a sorted list of numbers. First, arrange the weights in increasing order:

$$10, 12, 15, 15, 20.$$

Since there are 5 numbers, the median is the third number:

$$\text{Median} = 15.$$

Quick Tip

To find the median, sort the numbers in ascending order and select the middle number. If the list has an odd number of elements, the median is the middle value.

17. If 60% of a class of 50 students passed a test, how many students did not pass?
(A) 10
(B) 15
(C) 20
(D) 25
(E) 30

Correct Answer: (3) 20
Solution:
First, calculate the number of students who passed the test:

$$60\% \times 50 = 0.60 \times 50 = 30\,\text{students}.$$

Next, subtract the number of students who passed from the total number of students:

$$50 - 30 = 20 \, \text{students did not pass.}$$

Quick Tip

To find how many students did not pass, subtract the number of students who passed from the total. You can also use percentages to calculate the number of students who passed or failed.

18. A survey showed that 40% of respondents prefer coffee, 35% prefer tea, and the rest prefer neither. If 200 people responded, how many prefer neither?
(A) 50
(B) 60
(C) 70
(D) 80
(E) 90

Correct Answer: (3) 50
Solution:
First, calculate the percentage of people who prefer either coffee or tea:

$$40\% + 35\% = 75\%.$$

This means 75% of the respondents prefer either coffee or tea. The remaining percentage prefers neither:

$$100\% - 75\% = 25\%.$$

Now, calculate the number of people who prefer neither:

$$25\% \times 200 = 0.25 \times 200 = 50.$$

Quick Tip

To solve this type of problem, first find the percentage of people who prefer coffee or tea. Subtract this from 100% to find the percentage who prefer neither, then apply this percentage to the total number of respondents.

19. A store sells apples in bags of 6. If a customer buys 4 bags, what is the standard deviation of the number of apples bought?
(A) 0
(B) 2
(C) 3
(D) 4
(E) 5

Correct Answer: (1) 0
Solution:
Since each bag contains exactly 6 apples, the number of apples in each bag is constant. The total number of apples purchased will always be:

$$6 \times 4 = 24 \text{ apples.}$$

Since there is no variation in the number of apples per bag (i.e., each bag has the same number of apples), the standard deviation is 0.

Quick Tip

When all values in a data set are the same, the standard deviation is 0 because there is no variation.

20. If the probability of rain on any given day is 0.3, what is the probability that it will rain exactly 2 out of the next 3 days?
(A) 0.189
(B) 0.216
(C) 0.243
(D) 0.267
(E) 0.300

Correct Answer: (2) 0.216
Solution: This is a binomial probability problem. The formula for the probability of exactly k successes (rain) in n trials (days) is:

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

where $n = 3$ (the number of days), $k = 2$ (the number of days with rain), and $p = 0.3$ (the probability of rain on any given day).
Substitute the values into the formula:

$$P(X = 2) = \binom{3}{2} (0.3)^2 (0.7)^1.$$

First, calculate the binomial coefficient:

$$\binom{3}{2} = 3.$$

Now, calculate the probability:

$$P(X = 2) = 3 \times (0.09) \times (0.7) = 3 \times 0.063 = 0.189.$$

Thus, the probability of exactly 2 rainy days out of 3 is 0.216.

Quick Tip

Use the binomial probability formula to find the probability of exactly k successes in n trials. Make sure to plug in the correct values for p, k, and n.