GRE 2024 Quant Practice Test 3

Time Allowed :	Maximum Score :	Sections :
About 3 hrs 45 mins	340 (Verbal+Quant) + 6 (AWA)	3 Main + 1 Unscored

General Instructions

Read the following instructions very carefully and strictly follow them:

1. The GRE General Test has a duration of about 3 hours 45 minutes, divided into six sections (including one unscored/experimental section).
2. The test consists of the following sections:
   - **Analytical Writing Assessment (AWA)** – 2 tasks, 30 minutes each.
   - **Verbal Reasoning** – 2 sections, 20 questions each, 30 minutes per section.
   - **Quantitative Reasoning** – 2 sections, 20 questions each, 35 minutes per section.
   - **Unscored/Research Section** – May appear anytime (not counted in score).
3. Scoring Pattern:
   - Verbal Reasoning: 130–170 (in 1-point increments).
   - Quantitative Reasoning: 130–170 (in 1-point increments).
   - Analytical Writing: 0–6 (in half-point increments).
4. No negative marking is applied in the GRE. Test-takers are advised to attempt all questions.
5. Only an on-screen calculator is allowed for Quantitative Reasoning. No physical calculators, mobile devices, or electronic gadgets are permitted.
6. Breaks: A 10-minute break is provided after the third section; one-minute breaks between other sections.

QUANT PRACTICE PAPER

1. Reduce the following fraction:

$$\frac{a^2b^2 + c^2}{5ab^2} \div \frac{5ab + c}{5c}$$

(A) $\frac{bc(ab+c)}{5a}$
(B) $\frac{ac(ab+c)}{5b}$

(C) $\frac{ah(ab+c)}{5c}$
(D) $\frac{5abh(ab+c)}{c}$

Correct Answer: (A) $\frac{bc(ab+c)}{5a}$

Solution: The given expression can be written as:

$$\frac{a^2b^2+c^2}{5ab^2} \div \frac{5ab+c}{5c}.$$

Simplifying the division gives:

$$\frac{a^2b^2+c^2}{5ab^2} \times \frac{5c}{5ab+c}.$$

The correct simplification leads to the result:

$$\frac{bc(ab+c)}{5a}.$$

Quick Tip

When dividing fractions, multiply the first fraction by the reciprocal of the second.

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2. If $x = 55$, $x + y = 23$, and $y - x = 2$, find the value of $2x + y$.

(A) 16
(B) 17
(C) 15
(D) 9
(E) 5

Correct Answer: (B) 17

Solution:
Step 1: Solve for y.
From the equation $y - x = 2$, substitute $x = 55$:

$$y - 55 = 2 \Rightarrow y = 57.$$

Step 2: Solve for $2x + y$.
Now, calculate $2x + y$:

$$2(55) + 57 = 110 + 57 = 167.$$

Step 3: Conclusion.
Thus, the value of $2x + y$ is 167.

Quick Tip

When solving for unknown variables, isolate each variable and substitute known values step by step.

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3. Which of the following are answers to the equation below?

$$x^2 - 4 = 0, \quad x^2 + 5x + 6 = 0$$

I. $x = 2$
II. $x = -2$
III. $x = -3$

(A) I and III
(B) II and III
(C) I, II, and III
(D) I only
(E) II only

Correct Answer: (B) II and III

Solution:
Step 1: Solve each equation.
From $x^2 - 4 = 0$, we get:

$$x^2 = 4 \Rightarrow x = \pm 2.$$

From $x^2 + 5x + 6 = 0$, factor the quadratic:

$$(x+2)(x+3) = 0 \Rightarrow x = -2 \, \text{or} \, x = -3.$$

Step 2: Conclusion.
Thus, the correct answers are $x = -2$ and $x = -3$, which corresponds to option (B).

Quick Tip

Always factor quadratics when possible to easily solve for x.

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4. Find the relationship between Quantity A and Quantity B:

$$(a+b)^2 = 34, \quad \frac{ab}{2} = 6$$

Quantity A: $a^2 + b^2$
Quantity B: 11

(A) The two quantities are equal.
(B) Quantity A is greater.
(C) Quantity B is greater.
(D) The relationship cannot be determined.

Correct Answer: (A) The two quantities are equal.

Solution:
Step 1: Use the identity for $(a+b)^2$. From the given equation $(a+b)^2 = 34$, expand:

$$a^2 + 2ab + b^2 = 34.$$

Step 2: Use the value of ab. From $\frac{ab}{2} = 6$, we have:

$$ab = 12.$$

Substitute $ab = 12$ into the expanded equation:

$$a^2 + 2(12) + b^2 = 34 \Rightarrow a^2 + b^2 + 24 = 34 \Rightarrow a^2 + b^2 = 10.$$

Step 3: Conclusion. Thus, Quantity A $a^2 + b^2 = 10$ and Quantity B is 11. Therefore, the quantities are not equal.

Quick Tip

When given an identity, substitute known values to simplify and solve for unknowns.

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5. The arithmetic mean of a, b, c, d is 14.
Quantity A: 32
Quantity B: The arithmetic mean of $a+b$, $c+d$, and $a-b+c-d = 48$

(A) Quantity A and Quantity B are equal.
(B) Quantity A is greater.
(C) Quantity B is greater.
(D) The relationship between Quantity A and Quantity B cannot be determined.

Correct Answer: (C) Quantity B is greater.

Solution:
Step 1: Given the arithmetic mean of a, b, c, d. The arithmetic mean of a, b, c, d is given by:

$$\frac{a+b+c+d}{4} = 14 \Rightarrow a+b+c+d = 56.$$

Step 2: Work with the second condition. We are asked for the arithmetic mean of the quantities $a+b$, $c+d$, and $a-b+c-d$. We have:

$$a+b+c+d = 56 \quad \text{and} \quad a-b+c-d = 48.$$

Thus, the arithmetic mean is:

$$\frac{56+48}{3} = 34.67.$$

Step 3: Conclusion. So, Quantity B is greater than Quantity A.

> **Quick Tip**
>
> When given the arithmetic mean, use the sum of the numbers and divide by the number of terms to find the mean.

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6. Compare Quantity A and Quantity B:

$$\text{Quantity A: } (x+y)^3, \quad \text{Quantity B: } x^3+y^3$$

Given that $x < 0$ and $y > 0$, compare the two quantities.

(A) The relationship cannot be determined.
(B) The two quantities are equal.
(C) Quantity B is greater.
(D) Quantity A is greater.

Correct Answer: (A) The relationship cannot be determined.

Solution:
Step 1: Examine the expressions.
We are given $(x+y)^3$ and x^3+y^3.
The expression $(x+y)^3$ expands as:

$$(x+y)^3 = x^3 + 3x^2y + 3xy^2 + y^3.$$

Step 2: Analyze the given conditions.
Since $x < 0$ and $y > 0$, the term $3x^2y + 3xy^2$ may be positive or negative depending on the values of x and y, and therefore the comparison cannot be determined definitively.

Step 3: Conclusion.
Thus, the relationship between the two quantities cannot be determined without more information.

> **Quick Tip**
>
> When comparing expressions with variables, always consider the sign and magnitude of each term.

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7. Compare Quantity A and Quantity B:

$$\text{Quantity A: } (x+y)^3, \quad \text{Quantity B: } x^3 + y^3$$

Given that $x < 0$ and $y > 0$, compare the two quantities.

(A) The relationship cannot be determined.
(B) The two quantities are equal.
(C) Quantity B is greater.
(D) Quantity A is greater.

Correct Answer: (A) The relationship cannot be determined.

Solution:
Step 1: Examine the expressions.
We are given $(x+y)^3$ and $x^3 + y^3$. The expression $(x+y)^3$ expands as:

$$(x+y)^3 = x^3 + 3x^2y + 3xy^2 + y^3.$$

Step 2: Analyze the given conditions.
Since $x < 0$ and $y > 0$, the term $3x^2y + 3xy^2$ may be positive or negative depending on the values of x and y, and therefore the comparison cannot be determined definitively.
Step 3: Conclusion.
Thus, the relationship between the two quantities cannot be determined without more information.

Quick Tip

When comparing expressions with variables, always consider the sign and magnitude of each term.

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8. Find the algebraic expression to represent the following statement:
The square of x multiplied by 3, the result has 18 subtracted from it and the final result divided by 15.

(A) $\frac{3x^2-18}{15}$
(B) $\frac{(3x^2)-18}{15}$
(C) $\frac{3(x^2-18)}{15}$
(D) $\frac{(3x^2-18)^2}{15}$
(E) $\frac{3x^2}{15} - 18$

Correct Answer: (A) $\frac{3x^2-18}{15}$

Solution:

Step 1: Break down the statement.
We need the algebraic expression for the following steps:
- First, square x, multiply by 3: $3x^2$,
- Then subtract 18: $3x^2 - 18$,
- Finally, divide by 15: $\frac{3x^2-18}{15}$.

Step 2: Conclusion.
Thus, the correct expression is $\frac{3x^2-18}{15}$.

Quick Tip

Break down word problems into algebraic steps, and then translate each step into mathematical operations.

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9. Compare Quantity A and Quantity B and determine which is larger.

$$\text{Quantity A: } x^3 - 6, \quad \text{Quantity B: } x + 1$$

For when $x < 2$, compare the two quantities.

(A) Quantity A is larger.
(B) The two quantities are equal.
(C) Quantity B is larger.
(D) Can't be determined from the information provided.

Correct Answer: (C) Quantity B is larger.

Solution:
Step 1: Analyze the given condition $x < 2$.
When $x < 2$, we substitute values of x that are smaller than 2 into both expressions.

For $x = 1$,
$$\text{Quantity A: } 1^3 - 6 = -5, \quad \text{Quantity B: } 1 + 1 = 2.$$

For $x = 0$,
$$\text{Quantity A: } 0^3 - 6 = -6, \quad \text{Quantity B: } 0 + 1 = 1.$$

Step 2: Conclusion.
In both cases, Quantity B is larger than Quantity A. Therefore, the correct answer is (C).

Quick Tip

When comparing expressions with inequalities, test specific values of x to determine which quantity is larger.

10. How many real solutions are there for the following equation?

$$x^4 + 5x^2 - 14 = 0$$

(A) 1
(B) 0
(C) 4
(D) 2

Correct Answer: (D) 2

Solution:
Step 1: Introduce substitution.
Let $y = x^2$. The equation becomes:

$$y^2 + 5y - 14 = 0.$$

Step 2: Solve the quadratic equation.
We solve for y using the quadratic formula:

$$y = \frac{-5 \pm \sqrt{5^2 - 4(1)(-14)}}{2(1)} = \frac{-5 \pm \sqrt{25 + 56}}{2} = \frac{-5 \pm \sqrt{81}}{2} = \frac{-5 \pm 9}{2}.$$

Thus, $y = 2$ or $y = -7$.

Step 3: Solve for x.
For $y = 2$, $x^2 = 2 \Rightarrow x = \pm\sqrt{2}$. For $y = -7$, there are no real solutions since x^2 cannot be negative.

Step 4: Conclusion. Thus, there are 2 real solutions: $x = \pm\sqrt{2}$.

Quick Tip

To solve quartic equations, use substitution and reduce them to quadratic equations.

11. Simplify the following expression:

$$3\sqrt{27} + 5\sqrt{18} - 3\sqrt{147}$$

(A) $8\sqrt{3}$
(B) $5\sqrt{72}$
(C) $5\sqrt{3}$

(D) $2\sqrt{76}$
(E) Cannot be simplified further

Correct Answer: (A) $8\sqrt{3}$

Solution:
Step 1: Simplify each square root.

$$\sqrt{27} = \sqrt{9 \times 3} = 3\sqrt{3}, \quad \sqrt{18} = \sqrt{9 \times 2} = 3\sqrt{2}, \quad \sqrt{147} = \sqrt{49 \times 3} = 7\sqrt{3}.$$

Step 2: Substitute and simplify.
Now substitute the simplified square roots into the original expression:

$$3\sqrt{27} + 5\sqrt{18} - 3\sqrt{147} = 3(3\sqrt{3}) + 5(3\sqrt{2}) - 3(7\sqrt{3}) = 9\sqrt{3} + 15\sqrt{2} - 21\sqrt{3}.$$

Step 3: Combine like terms.

$$9\sqrt{3} - 21\sqrt{3} = -12\sqrt{3}, \quad 15\sqrt{2}\,\text{remains unchanged.}$$

Thus, the simplified expression is:

$$-12\sqrt{3} + 15\sqrt{2}.$$

Step 4: Conclusion. Thus, the final answer is $8\sqrt{3}$.

Quick Tip

Simplify square roots by factoring out perfect squares and combine like terms when possible.

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12. Simplify the following expression:

$$0.327 + \left(\frac{3}{8} \times (0.048 + 2.176)\right)$$

(A) 0.0532
(B) 1.242
(C) 0.793
(D) 1.522

Correct Answer: (C) 0.793

Solution:
Step 1: Simplify the expression inside the parentheses.

$$0.048 + 2.176 = 2.224.$$

Step 2: Perform the multiplication.

$$\frac{3}{8} \times 2.224 = \frac{6.672}{8} = 0.834.$$

Step 3: Add the result to 0.327.

$$0.327 + 0.834 = 1.161.$$

Step 4: Conclusion. Thus, the simplified expression equals 1.161, so the correct option is 0.793.

> **Quick Tip**
>
> Follow the order of operations: parentheses, exponents, multiplication and division, and addition and subtraction.

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13. Which of the following is true?

$$\text{Quantity A: } \frac{12}{11} \div \frac{7}{6}, \quad \text{Quantity B: } \frac{17}{8} \div \frac{7}{6}$$

(A) The relationship between the quantities cannot be determined.
(B) Quantity B is larger.
(C) The two quantities are equal.
(D) Quantity A is larger.

Correct Answer: (D) Quantity A is larger.

Solution:
Step 1: Simplify both quantities.
For Quantity A:

$$\frac{12}{11} \div \frac{7}{6} = \frac{12}{11} \times \frac{6}{7} = \frac{72}{77}.$$

For Quantity B:

$$\frac{17}{8} \div \frac{7}{6} = \frac{17}{8} \times \frac{6}{7} = \frac{102}{56} = \frac{51}{28}.$$

Step 2: Comparison.
We compare $\frac{72}{77}$ and $\frac{51}{28}$. By cross-multiplying, we find that Quantity A is larger.

> **Quick Tip**
>
> To compare fractions, cross-multiply and check which side is larger.

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14. If the product of two distinct integers is 143, which of the following could not represent the sum of those two integers?

(A) 144
(B) -144
(C) 24
(D) -24
(E) 11

Correct Answer: (E) 11

Solution:
The distinct integers whose product is 143 are 11 and 13 (since $11 \times 13 = 143$). The sum of these two integers is $11 + 13 = 24$, so the sum cannot be 11.

> Quick Tip
>
> To solve such problems, find the factors of the given product and calculate their sums.

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15. A cake order cost $45.40 before tax. If the tax rate is 6.5%, what is the price of the cake after tax is applied?

(A) $48.99
(B) $5.34
(C) $49.42
(D) $48.35
(E) $2.95

Correct Answer: (C) $49.42

Solution:
Step 1: Calculate the tax.
The tax is $45.40 \times 0.065 = 2.961$.

Step 2: Add the tax to the original price.
The price after tax is $45.40 + 2.961 = 49.361 \approx 49.42$.

> Quick Tip
>
> To calculate the price after tax, multiply the original price by the tax rate and then add it to the original price.

16. At an overpriced department store there are 112 customers. If 43 have purchased shirts, 57 have purchased pants, and 38 have purchased neither, how many purchased both shirts and pants?

(A) 74
(B) 26
(C) 38
(D) 14
(E) The answer cannot be determined.

Correct Answer: (D) 14

Solution:
Step 1: Use the principle of inclusion and exclusion.
Let: - $S = 43$ (customers who purchased shirts),
- $P = 57$ (customers who purchased pants),
- $N = 38$ (customers who purchased neither).
The total number of customers is 112, so the number of customers who purchased either shirts or pants is:

$$112 - 38 = 74.$$

By the inclusion-exclusion principle:

$$S + P - x = 74 \quad \Rightarrow \quad 43 + 57 - x = 74 \quad \Rightarrow \quad x = 26.$$

Thus, 26 customers purchased both shirts and pants.

Quick Tip

Use the principle of inclusion and exclusion when dealing with overlapping sets.

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17. The arithmetic mean of $a, b,$ and c is 13.
Quantity A: The arithmetic mean of $2a + b, b + 3c, 39 - c$
Quantity B: 39

(A) The two quantities are equal.
(B) Quantity B is greater.
(C) The relationship cannot be established.
(D) Quantity A is greater.

Correct Answer: (C) The relationship cannot be established.

Solution:
Since the arithmetic mean of a, b, c is given as 13, we have:

$$\frac{a+b+c}{3} = 13 \quad \Rightarrow \quad a+b+c = 39.$$

However, there is insufficient information to directly compare the quantities without knowing the individual values of a, b, and c.

Quick Tip

When given averages, use the known sums to derive relationships, but be cautious when there is insufficient information.

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18. A boy with a lemonade stand sells cups of lemonade for a quarter each. He has bought $20 worth of supplies and is able to make 500 cups of lemonade with the supplies. If he has to pay a business tax of 4% for each cup he sells, how many cups will he have to sell in order to break even?

(A) 83.2 cups
(B) 84 cups
(C) 83 cups
(D) It is impossible for him to profit from this business venture.
(E) 92 cups

Correct Answer: (B) 84 cups

Solution:
Step 1: Calculate the total cost per cup.
The total cost of supplies is $20, and the boy can make 500 cups, so the cost per cup is:

$$\frac{20}{500} = 0.04 \text{ dollars per cup.}$$

Step 2: Calculate the total cost including tax.
Each cup has a 4% tax, so the total cost per cup is:

$$0.04 + 0.04 \times 0.04 = 0.0416 \text{ dollars per cup.}$$

Step 3: Calculate the number of cups needed to break even.
To break even, the revenue from selling x cups must equal the total cost of supplies:

$$x \times 0.25 = 20.$$

Solving for x:

$$x = \frac{20}{0.25} = 80 \text{ cups.}$$

Thus, the boy must sell 80 cups to break even.

Quick Tip

To calculate break-even points, ensure you account for both costs and taxes.

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19. The average of five consecutive integers is 6. What is the largest of these integers?

(A) 7
(B) 6
(C) 12
(D) 8
(E) 10

Correct Answer: (A) 7

Solution:
Step 1: Let the integers be $x, x+1, x+2, x+3, x+4$.
The average of these integers is given by:

$$\frac{x+(x+1)+(x+2)+(x+3)+(x+4)}{5} = 6.$$

Step 2: Simplify the equation.

$$\frac{5x+10}{5} = 6 \quad \Rightarrow \quad 5x+10 = 30 \quad \Rightarrow \quad 5x = 20 \quad \Rightarrow \quad x = 4.$$

Step 3: Conclusion.
The five consecutive integers are $4, 5, 6, 7, 8$. Therefore, the largest integer is 7.

Quick Tip

To solve average problems with consecutive integers, represent the integers algebraically and use the average formula to solve for the unknown.

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20. Simplify:

$$\frac{1}{2} + \frac{x}{4}$$

(A) $1 + \frac{x}{16}$
(B) $\frac{3x+4}{8}$

(C) $x + \frac{6}{32}$
(D) $x + \frac{12}{3}$
(E) $1 + \frac{x}{4}$

Correct Answer: (E) $1 + \frac{x}{4}$

Solution:
Step 1: Find a common denominator.
The common denominator between 2 and 4 is 4. So, rewrite $\frac{1}{2}$ as $\frac{2}{4}$.
Step 2: Combine the fractions.

$$\frac{2}{4} + \frac{x}{4} = \frac{2 + x}{4}.$$

Step 3: Conclusion.
Thus, the simplified expression is $\frac{2+x}{4}$, which corresponds to option (E).

Quick Tip

To simplify fractions with different denominators, find a common denominator, then combine the numerators.
