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FRACTIONS

Adding — Same Denominator

a/b + c/b = (a+c)/b

Adding — Different Denominators

a/b + c/d = (ad+bc)/bd

EXAMPLE

3/5 + 2/9 = (27+10)/45 = **37/45**

Subtracting

a/b − c/d = (ad−bc)/bd

Multiplying

a/b × c/d = ac/bd

EXAMPLE

3/4 × 5/7 = **15/28**

Dividing

a/b ÷ c/d = a/b × d/c = ad/bc

EXAMPLE

3/8 ÷ 6/5 = 3/8 × 5/6 = **5/16**

Distributive Property

(a+c)/b = a/b + c/b

Comparing Size — Cross Multiply

a/b > c/d if ad > bc

EXAMPLE

5/7 > 4/6 because 30 > 28

Squares & Roots of Fractions

$(a/b)^2 = a^2/b^2$ $\sqrt{(x/y)} = \sqrt{x} / \sqrt{y}$

0 < x < 1 Property

$x^2 < x < \sqrt{x}$ when $0 < x < 1$

LINEAR & QUADRATIC EQUATIONS

Factoring Out Common Factors

If a term appears in every expression, factor it out.

EXAMPLE

6x + 6y = 12 → 6(x + y) = 12

Zero Product Property

If a × b = 0, then a = 0 or b = 0 or both.

EXAMPLE

x(x + 50) = 0 → x = 0 or x = −50

General Form of a Quadratic

$ax^2 + bx + c = 0$

Must be in this form before factoring.

Factoring a Quadratic

$x^2 + bx + c = (x+p)(x+q) = 0$

- → p and q **multiply** to c
- → p and q **add** to b

EXAMPLE

$x^2-7x-18=0$ → $(x-9)(x+2)=0$
−9 and 2 multiply to −18; add to −7

FOIL — First · Outer · Inner · Last

EXAMPLE

$(x-5)(x+3)$: F=x^2 O=3x I=−5x L=−15 = $x^2-2x-15$

3 Key Quadratic Identities

- → $(x+y)^2 = x^2 + 2xy + y^2$
- → $(x-y)^2 = x^2 - 2xy + y^2$
- → $(x+y)(x-y) = x^2 - y^2$

Difference of Squares Examples

- → $x^2-16 = (x-4)(x+4)$
- → $9x^2-25 = (3x-5)(3x+5)$

PEMDAS

Parentheses	Exponents
Mult & Div	Add & Sub

PROPERTIES OF NUMBERS

Even/Odd — Addition & Subtraction

odd+odd=even	even+even=even
even+odd=odd	odd−odd=even

Even/Odd — Multiplication

even×even=even	even×odd=even
odd×even=even	odd×odd=odd

Sign Rules

(+)(+)=(+)	(−)(−)=(+)
(+)(−)=(−)	(+)/(−)=(−)

Factors

If y divides evenly into x, then y is a factor of x.

EXAMPLE

Factors of 24: 1, 2, 3, 4, 6, 8, 12, 24

Multiples

Multiples of n: n, 2n, 3n, 4n, ...

Division Formula

x/y = Quotient + remainder/y

EXAMPLE

31 ÷ 7 = 4 + 3/7

Range of Remainders

Remainder must be a non-negative integer less than the divisor.

Primes Under 100

2,3,5,7,11,13,17,19,23,29,31,37,41,43,47,53,59,61,67,71,73,79,83,89,97

Finding Number of Factors

- → Prime factorize the number
- → Add 1 to each exponent, multiply all results

EXAMPLE

180 = $2^2 \times 3^2 \times 5^1$ → (2+1)(2+1)(1+1) = **18 factors**

DIVISIBILITY RULES

Div by	Rule
2	Last digit: 0,2,4,6,8
3	Sum of digits divisible by 3
4	Last two digits div by 4
5	Last digit: 0 or 5
6	Divisible by both 2 AND 3
8	Last 3 digits div by 8
9	Sum of digits divisible by 9
11	Alt digit sum difference div by 11

Finding the LCM

- → Prime factorize each integer
- → Take repeated primes with **largest** exponent
- → Take all non-repeated prime factors
- → Multiply everything together

LCM OF 18 AND 30

18=$2^1 \times 3^2$, 30=$2^1 \times 3^1 \times 5^1$ → take 3^2, 2^1, 5^1 → **LCM = 90**

Finding the GCF

- → Prime factorize each number
- → Take repeated primes with **smallest** exponent
- → Multiply together

GCF OF 18 AND 30

Common: 2^1, 3^1 → **GCF = 6**

LCM × GCF Rule

LCM(x,y) × GCF(x,y) = x × y

Factorials ≥ 5!

Any factorial ≥ 5! always ends in 0 (units digit = 0).

Trailing Zeros

Count (5×2) pairs in prime factorization.

EXAMPLE

40! → ⌊40/5⌋+⌊40/25⌋ = 8+1 = **9 trailing zeros**

UNITS DIGIT PATTERNS

Base	Pattern
0 or 1	Always 0 or 1
2	2→4→8→6 (4-cycle)
3	3→9→7→1 (4-cycle)
4	4→6 (2-cycle)
5 or 6	Always 5 or 6
7	7→9→3→1 (4-cycle)
8	8→4→2→6 (4-cycle)
9	9→1 (2-cycle)

Perfect Squares

All prime factors have **even** exponents.

0,1,4,9,16,25,36,49,64,81,100,121,144,169,196,225

Perfect Cubes

All prime factors have exponents **divisible by 3**.

0,1,8,27,64,125,216,343,512,729,1000

Terminating Decimals

Terminates only if reduced denominator has only 2s and/or 5s.

1/8 = 0.125 ✓ | **1/6 = 0.1666... ✗**

Two Consecutive Integers

Never share prime factors. GCF of any two consecutive integers = 1.

Trailing & Leading Zeros

- Trailing zeros: count (5×2) pairs in prime factorization
- Leading zeros in 1/x: if x has k digits → k−1 leading zeros (k−2 if x is a perfect power of 10)

ROOTS & RADICALS

Multiplying Radicals

$\sqrt{a} \times \sqrt{b} = \sqrt{(ab)}$

EXAMPLE

$\sqrt{6} \times \sqrt{10} = \sqrt{60} = 2\sqrt{15}$

Dividing Radicals

$\sqrt{a} / \sqrt{b} = \sqrt{(a/b)}$

EXAMPLE

$\sqrt{72} / \sqrt{8} = \sqrt{9} = 3$

Adding/Subtracting Radicals

$\sqrt{a} + \sqrt{b} \neq \sqrt{(a+b)}$ — you CANNOT combine unlike radicals!

You CAN add like radicals: $3\sqrt{5} + 7\sqrt{5} = 10\sqrt{5}$

EXAMPLE

$\sqrt{9} + \sqrt{16} = 3+4 = 7 \neq \sqrt{25} = 5$

Square Root of a Binomial

$\sqrt{[(x+y)^2]} = |x+y|$

Radicals as Exponents

$\sqrt{x} = x^{(1/2)}$ $\sqrt[3]{x} = x^{(1/3)}$

$\sqrt[b]{x^a} = x^{(a/b)}$

EXAMPLE

$(\sqrt[3]{x})^2 = x^{(2/3)}$

Key Approximations

$\sqrt{2} \approx 1.41$	$\sqrt{3} \approx 1.73$
$\sqrt{5} \approx 2.24$	$\sqrt{7} \approx 2.65$

Large Perfect Square Roots

2k trailing zeros → root has k trailing zeros.
$\sqrt{10,000} = 100$ $\sqrt{40,000} = 200$

Cube Roots of Perfect Cubes

3k trailing zeros → cube root has k zeros.

EXPONENT RULES

Core Laws

- $x^1 \cdot x^2 = x^{(a+b)}$ (same base × → add)
- $x^1 / x^2 = x^{(a-b)}$ (same base ÷ → subtract)
- $(x^1)^2 = x^{(ab)}$ (power to power → multiply)
- $(xy)^1 = x^1y^1$
- x&sup0; = 1 (x ≠ 0)
- $x^{(-y)} = 1/x^1$

Powers of 2

$2^0=1$	$2^1=2$	$2^2=4$
$2^3=8$	$2^4=16$	$2^5=32$
$2^6=64$	$2^7=128$	$2^8=256$
$2^9=512$	$2^{10}=1024$	

Other Key Powers

$3^4=81$	$3^5=243$
$4^3=64$	$5^4=625$

Special Addition Rule

- $2^n + 2^n = 2^{n+1}$
- $3^n + 3^n + 3^n = 3^{n+1}$
- Adding k^n exactly k times = k^{n+1}

Adding Like Bases — Factor First!

EXAMPLE

$3^8+3^9+3^{10} = 3^8(1+3+9) = 3^8(13)$

Negative Exponents

$x^{(-y)} = 1/x^y$

EXAMPLES

$5^{-3}=1/125$ $(2/3)^{-2}=(3/2)^2=9/4$

EXPONENT NUMBER PROPERTIES

CASE 1
Base > 1, Even Positive Exponent
Result is LARGER
$6^2=36 > 6$

CASE 2
Base > 1, Odd Positive Exponent (>1)
Result is LARGER
$4^3=64 > 4$

CASE 3
Base < −1, Even Positive Exponent
Result is LARGER (positive)
$(-4)^2=16 > -4$

CASE 4
Base < −1, Odd Positive Exponent (>1)
Result is SMALLER (more negative)
$(-4)^3=-64 < -4$

CASE 5
0 < Base < 1, Even Positive Exponent
Result is SMALLER
$(1/4)^2=1/16 < 1/4$

CASE 6
−1 < Base < 0, Even Positive Exponent
Result is LARGER (less negative)
$(-1/4)^2=1/16 > -1/4$

CASE 7
0 < Base < 1, Odd Positive Exponent (>1)
Result is SMALLER
$(1/4)^3=1/64 < 1/4$

CASE 8
−1 < Base < 0, Odd Positive Exponent (>1)
Result is LARGER
$(-1/4)^3>-1/4$

CASE 9
Base > 1, Fractional Exponent
Result is SMALLER
$8^{(1/3)}=2 < 8$

CASE 10
0 < Base < 1, Fractional Exponent
Result is LARGER
$(1/9)^{(1/2)}=1/3 > 1/9$

ABSOLUTE VALUE & INEQUALITIES

Definition

→ If $a \geq 0$: $|a| = a$
→ If $a < 0$: $|a| = -a$

$\|75\| = 75$	$\|-75\| = 75$

One Absolute Value Equation

Solve twice: positive case AND negative case.

EXAMPLE: $|3X + 6| = 18$

$3x+6=18 \rightarrow x=4$
$-(3x+6)=18 \rightarrow x=-8$

Two Equal Absolute Values

If $|A| = |B|$, then $A = B$ or $A = -B$.

EXAMPLE: $|4X+2| = |2X+10|$

$4x+2=2x+10 \rightarrow x=4$
$4x+2=-(2x+10) \rightarrow x=-2$

Adding Absolute Values

$$|a+b| \leq |a| + |b|$$

Equality holds when a,b same sign or one is zero.

Subtracting Absolute Values

$$|a-b| \geq |a| - |b|$$

Inequality Rules

→ Add/subtract: sign stays the same
→ × or ÷ by **positive**: sign stays
→ × or ÷ by **negative**: **FLIP the sign!**

Compound Inequalities

$$|x| < k \rightarrow -k < x < k$$

$$|x| > k \rightarrow x < -k \text{ or } x > k$$

WORD PROBLEMS

Key Translations

English	Math
is / was / has been	=
more / older	+
less / fewer / younger	−
times / of / factor of	×
less than	−
as many as	×
what / some number	variable

Price Per Item

$$\text{Price/item} = \text{Total Cost} \div \#\text{ of Items}$$

Profit Equation

$$\text{Profit} = \text{Revenue} - \text{Total Cost}$$

→ Total Cost = Fixed Costs + Variable Costs

Simple Interest

$$I = P \times r \times t$$

P = principal, r = annual rate, t = years

Compound Interest

$$A = P(1 + r/n)^{nt}$$

→ n = times compounded per year
→ t = time in years

Linear Growth

$$F_n = p + k \cdot n$$

→ p = initial value, k = increase per period

Consecutive Integers

→ Integers: x, x+1, x+2, ...
→ Even/Odd: x, x+2, x+4, ...
→ Multiples of k: x, x+k, x+2k, ...

RATE & WORK PROBLEMS

Distance–Rate–Time

$$\text{Distance} = \text{Rate} \times \text{Time}$$

$T = D / R$	$R = D / T$

Average Rate Formula

$$\text{Avg Rate} = \text{Total Distance} / \text{Total Time}$$

Never just average two speeds! Always use total D and total T.

Converging / Diverging

$$D_1 + D_2 = D_{total} \text{ (moving toward each other)}$$

Round-Trip & Catch-Up

→ Round-trip: D_out = D_return
→ Catch-up: $D_1 = D_2$ at meeting point

$$\text{Catch \& pass: Time} = \Delta\text{Distance} / \Delta\text{Rate}$$

WORK PROBLEMS

Work Formula

$$\text{Work} = \text{Rate} \times \text{Time}$$

Rate = W/T	Time = W/R

Individual Work Rate

a jobs in b hours → Rate = a/b jobs per hour.

EXAMPLE

12 reports in 4 days → Rate = 3/day

Combined Workers

$$\text{Work}_A + \text{Work}_B = \text{Work}_{Total}$$

$$1/T_{combined} = 1/T_A + 1/T_B$$

RATIOS

3 Ways to Write a Ratio

→ cats/dogs = 5/3
→ cats : dogs = 5 : 3
→ cats to dogs = 5 to 3

Part-to-Total Ratio

If part1=x and part2=3x:
part1/total = x/(4x) = 1/4

Combining Ratios — Use LCM

EXAMPLE

x:y=2:5 and x:z=3:7
LCM(2,3)=6 → x:y:z = **6:15:14**

PERCENT WORD PROBLEMS

Converting

→ Fraction → %: divide, ×100, add %
→ % → decimal: drop %, ÷ 100

Percent Of

$$n\% \text{ of } x = (n/100) \times x$$

Percent Less / Greater Than

→ n% less than y → × (1 − n/100)
→ n% greater than y → × (1 + n/100)

30% less → ×0.70	30% more → ×1.30

Percent Change Formula

$$\%\text{ Change} = (\text{Final}-\text{Initial})/\text{Initial} \times 100$$

What Percent Translation

$$\text{"a is what \% of b?"} \rightarrow (a/b) \times 100$$

Successive Percents

Two consecutive % changes do NOT simply add!
+20% then −20%: 100→120→96 (net −4%)

STATISTICS

Arithmetic Mean

Mean = Sum of all terms / # of terms

Evenly Spaced Sets

Mean = Median in any evenly spaced set.

Mean = (Highest + Lowest) / 2

Counting Integers (Inclusive)

Count = Highest − Lowest + 1

EXAMPLE

Integers 12–47: 47−12+1 = **36**

Counting Multiples in a Range

Count = (High_mult − Low_mult) / k + 1

Weighted Average

WA = Σ(value × freq) / Total frequency

WA is always closer to the data point with greater weight.

Median

- **Order the set first!**
- Odd # of terms: position = (n+1)/2
- Even # of terms: avg of n/2 and (n/2+1) positions

Mode & Range

- Mode: most frequently appearing value
- Range = Highest − Lowest

Standard Deviation Rules

- Add/subtract a constant → SD unchanged
- Multiply/divide each term by k → SD × k (or ÷k)

High = mean + x·SD Low = mean − x·SD

OVERLAPPING SETS

Two-Set Formula

#(A or B) = #A + #B − #(A and B)

Two-Set with Neither

Total = #A + #B − #Both + #Neither

Double Matrix — Two Binary Attributes

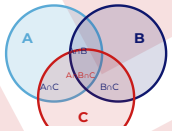
	Has X	No X	Total
Has Y			
No Y			
Total			

Three-Set — Unique Count Known

Total = A_only + B_only + C_only + (A∩B)_only + (A∩C)_only + (B∩C)_only + A∩B∩C + Neither

Three-Set — Unique Count Unknown

Total = #A+#B+#C − #(exactly 2) − 2×#(all 3) + #Neither



COMBINATIONS & PERMUTATIONS

Combinations — Order Does NOT Matter

$_nC_k = n! / [(n−k)! \times k!]$

EXAMPLE

Choose 3 from 7: $_7C_3 = 7!/(4! \times 3!) =$ **35**

Permutations — Order DOES Matter

$_nP_k = n! / (n−k)!$

EXAMPLE

Arrange 3 from 7: $_7P_3 = 7!/4! =$ **210**

Permutations with Repeated Items

$P = N! / (r_1! \times r_2! \times \ldots \times r_n!)$

EXAMPLE

Arrange PEPPER: 6!/(3!×2!×1!) = **60 ways**

Circular Arrangements

Circular arrangements = (k − 1)!

EXAMPLE

5 people around a table: (5−1)! = **24 ways**

Counting Principle (AND Rule)

If A has m outcomes and B has n outcomes: m × n total.

C vs. P — Which to Use?

Committee → C	Ordered list → P
Team selection → C	Different prizes → P

PROBABILITY

Basic Formula

P = Favorable / Total Outcomes

Sample Space Rule

All probabilities in a sample space must sum to 1.

Complementary Events

P(A) + P(not A) = 1

P(at least 1) = 1 − P(none)

P(A AND B)

- **Independent:** P(A and B) = P(A) × P(B)
- **Dependent:** P(A and B) = P(A) × P(B|A)

EXAMPLE

P(2 heads) = 1/2 × 1/2 = 1/4

P(A OR B)

- **Mutually exclusive:** P(A or B) = P(A) + P(B)
- **Not mutually exclusive:** P(A or B) = P(A)+P(B)−P(A and B)

Conditional Probability

P(B|A) = P(A and B) / P(A)

Read as: probability of B *given* A occurred.

Probability with Combinations

P = $_nC_k$(favorable) / $_nC_k$(total)

EXAMPLE

P(2 red from 5R+3B): $_5C_2/_8C_2 = 10/28 = 5/14$

ANGLES & TRIANGLES

Angle Types

Acute < 90°	Right = 90°
Obtuse 90–180°	Straight = 180°

Full rotation = 360° | Supplementary angles sum to 180°

Parallel Lines + Transversal

- Vertical angles are equal
- Corresponding angles are equal
- Alternate interior angles are equal
- Co-interior angles sum to 180°

Triangle Rules

- Interior angles sum to 180°
- Exterior angle = sum of 2 non-adjacent interior angles

Triangle Inequality: sum of any 2 sides must be greater than the 3rd side.

Area of a Triangle

Area = ½ × base × height

Pythagorean Theorem

$A^2 + B^2 = C^2$

Pythagorean Triples

3–4–5	5–12–13
8–15–17	7–24–25

Any multiple is also a triple (e.g. 6-8-10).

45–45–90 Triangle

Legs: x Hypotenuse: x√2

Square diagonal = side × √2

30–60–90 Triangle

Short: x Long: x√3 Hyp: 2x

Equilateral triangle altitude → two 30-60-90 triangles.

Equilateral Triangle Area

Area = (side² × √3) / 4

POLYGONS

Interior Angles Sum

Sum = (n − 2) × 180°

Shape	Sides	Sum
Triangle	3	180°
Quadrilateral	4	360°
Pentagon	5	540°
Hexagon	6	720°
Octagon	8	1080°

Exterior angles of ANY polygon always sum to 360°.

Rectangle

- Perimeter = 2L + 2W
- Area = L × W
- Diagonal = $\sqrt{(L^2+W^2)}$

Fixed perimeter → max area = **square**
Fixed area → min perimeter = **square**

Square

- Perimeter = 4s Area = s^2
- Diagonal = s√2

Parallelogram & Trapezoid

- Parallelogram Area = base × height

Trapezoid Area = $\frac{1}{2}(b_1+b_2) \times h$

Hexagon

Area = (3√3 / 2) × s^2

CIRCLES

Core Formulas

Area = πr^2 Circumference = $2\pi r$

Diameter = 2r. Chord: both endpoints on the circle.

Arc Length

Arc = (Angle / 360) × $2\pi r$

Sector Area

Sector = (Angle / 360) × πr^2

Inscribed Angles

- Central angle = 2 × inscribed angle (same arc)
- Inscribed angle in semicircle = 90°

Triangle inscribed with one side as the diameter is always a right triangle.

Circular Ring Area

Area = $\pi(R_{outer}^2 - R_{inner}^2)$

3D GEOMETRY

Cylinder (r = radius, h = height)

- Volume = $\pi r^2 h$
- Surface Area = $2\pi r^2 + 2\pi rh$

Cube (s = side)

- Volume = s^3 Surface Area = $6s^2$
- Diagonal = s√3

Rectangular Solid (L, W, H)

- Volume = L × W × H
- Surface Area = 2(LW + WH + LH)
- Diagonal = $\sqrt{(L^2+W^2+H^2)}$

COORDINATE GEOMETRY

Slope Formula

$m = (y_2-y_1) / (x_2-x_1)$ = Rise/Run

Slope-Intercept Form

y = mx + b (m = slope, b = y-intercept)

Positive: ↗	Negative: ↘
Zero: —	Undefined: |

Parallel & Perpendicular

- Parallel: same slope, different y-intercept
- Perpendicular: $m_1 \times m_2 = -1$ (negative reciprocals)

Distance & Midpoint

$D = \sqrt{[(x_2-x_1)^2+(y_2-y_1)^2]}$

Midpoint = $((x_1+x_2)/2 , (y_1+y_2)/2)$

Reflections

x-axis: (x,y) → (x,−y)	y-axis: (x,y) → (−x,y)
origin: (x,y) → (−x,−y)	y=x: (x,y) → (y,x)

FUNCTIONS & SEQUENCES

Arithmetic Sequence

$a_n = a_1 + (n-1)d$

- d = common difference

Sum $S_n = (n/2)(a_1 + a_n)$

Geometric Sequence

$a_n = a_1 \times r^{n-1}$

- r = common ratio

EXAMPLE

4,12,36,108 (r=3): $a_5 = 4 \times 3^4 = 324$

QC: THE 4 ANSWER CHOICES

These are **always** the same — memorize them cold.

A — Quantity A is greater
A is ALWAYS greater under every possible condition

B — Quantity B is greater
B is ALWAYS greater under every possible condition

C — The two quantities are equal
They are ALWAYS equal under every possible condition

D — Cannot be determined
The relationship CHANGES depending on the values used

If you get two **different answers** when plugging in different values → the answer is always **D**.

The Epic QC Attack Plan

- → Simplify both sides first — treat like an equation
- → Look for a constraint (integer? positive? non-zero?)
- → Plug in strategic numbers to test
- → If answers differ across values → pick D immediately
- → If quantities look equal, verify with an edge case
- → Don't reach for the calculator — most QC questions don't need it

THE 7 CLASSIC QC TRAPS

TRAP 1 — Assuming Variables Are Positive
If the problem doesn't say x > 0, test **x = 0**, **x = −1**, and **x = 1/2**. Zero and negatives destroy most "obvious" answers.
QA: x QB: 3x → Looks like B, but x = 0 makes them equal, x = −1 flips it. Answer: D

TRAP 2 — Squaring Changes the Comparison
x^2 is NOT always > x. When $0 < x < 1$, $x^2 < x$. When $x < 0$, $x^2 > 0 > x$. Always test fractions and negatives with powers.
QA: x^2 QB: x → x = 2 gives A wins; x = 0.5 gives B wins. Answer: D

TRAP 3 — Geometry Not Drawn to Scale
GRE figures are **NOT necessarily drawn to scale** unless stated. A triangle that looks right-angled is not — unless the problem says so. Redraw with extreme values on your scratch paper.
Trap: assuming equal-looking segments are equal, or a shape is regular when it isn't.

TRAP 4 — "Impossible" Geometry IS Solvable
QC geometry that looks unsolvable often has a hidden constraint that pins the answer. Check for parallel lines, isosceles triangles, angle rules, or a fixed total (e.g. angles in a triangle sum to 180°) that uniquely determines the answer.
If a constraint fixes the shape, the answer is A, B, or C — not D.

TRAP 5 — The "Too Easy" Trap
If a QC looks instantly obvious, there's almost certainly a twist. Slow down. Check for hidden constraints, special cases (x = 0, x = 1), or a diagram that's misleading you.

TRAP 6 — Ignoring the Constraint
The centered information above the two quantities is a **constraint**, not flavor text. It often changes everything. Write it down. Many QC problems are designed so that ignoring the constraint leads directly to the wrong answer.

TRAP 7 — Fraction / Decimal Behavior
Fractions between 0 and 1 behave counterintuitively: multiplying makes them **smaller**, squaring makes them **smaller**, taking the square root makes them **larger**. Always test x = 1/2 when fractions could be involved.

STRATEGIC PLUG-IN NUMBERS

When variables appear in QC, systematically test these values in this order:

THE EPIC 5
0 1 −1 ½ 2
Test these every time variables appear with no constraints

Value	Why it's useful
0	Kills multiplication, collapses exponents to 0
1	Powers stay the same: $1^2=1^3=1$
−1	Flips inequalities, reveals sign traps
1/2	Fractions: squaring makes smaller, rooting makes larger
2	Simple positive integer baseline
−1/2	Negative fraction: combines sign + fraction traps
Large (100)	Tests behavior at extremes

How to Use Plug-In Results

- → Same answer every time → strong signal for A, B, or C
- → Different answers across values → answer is **D**
- → Two values give the same result but a third differs → **D**
- → Only need **two different outcomes** to confirm D

Simplify Before Plugging In

Treat QC like an equation: add, subtract, multiply, or divide the same thing from both sides to simplify. Only multiply/divide by a **positive** number — if the sign is unknown, you cannot do this.

EXAMPLE

QA: 3x + 6 QB: 3x + 9
Subtract 3x from both → QA: 6 QB: 9 → Answer: **B** always

GRE QUESTION TYPES: QUANT

Quantitative Comparison (QC)

Compare Quantity A vs Quantity B. Same 4 choices every time. About half of all quant questions.

Problem Solving (PS)

Standard MCQ: pick one answer from 5, or select all that apply (checkboxes), or enter a numeric value directly.

Data Interpretation (DI)

2–3 questions based on a shared chart, table, or graph. Read axes carefully. Watch for "approximate" and "closest to."

GRE TEST STRUCTURE

Section	Questions	Time
Analytical Writing	1 essay	30 min
Verbal 1	12 questions	18 min
Quant 1	12 questions	21 min
Verbal 2*	15 questions	23 min
Quant 2*	15 questions	26 min

*Adaptive: harder if you did well in section 1. Score range: 130–170 per section.

VERBAL QUESTION TYPES (QUICK REF)

Text Completion (TC)

1–3 blanks. Fill each blank independently. No partial credit — all blanks must be correct.

Sentence Equivalence (SE)

Select **2** words that both complete the sentence AND produce sentences alike in meaning.

Reading Comprehension (RC)

Single-answer MC, multi-answer (select all), and sentence highlight. Passage types: argument, social science, natural science, humanities.

GRE SCORING

130–170 Quant	**130–170 Verbal**
0–6 Writing	**1-pt increments**