SOFTWARE & TECH

Gmat Math Formulas Cheat Sheet

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Introduction: Why a GMAT Math Formulas Cheat Sheet Is Your Secret Weapon

If you are preparing for the GMAT, you already know that the Quantitative Reasoning section can make or break your overall score. The exam tests not just your ability to crunch numbers, but your skill in applying fundamental math concepts quickly and accurately under time pressure. That's where a well-organized **GMAT Math Formulas Cheat Sheet**comes into play. It serves as a quick reference to the core formulas you need to memorize, so you can focus on strategy rather than racking your brain for a forgotten equation.

In this article, we will walk you through every essential formula, from arithmetic and algebra to geometry, statistics, and combinatorics. By the end, you'll have a clear, structured summary that you can print out, save to your phone, or turn into flashcards. Whether you are a first-time test taker or looking to improve your quant score, this cheat sheet will become your most valuable study companion.

The Structure of GMAT Quantitative Reasoning

Before diving into the formulas, it is important to understand the two types of questions you will face:

- Problem Solving – Standard multiple-choice questions where you apply formulas and reasoning to find the correct answer.
- Data Sufficiency – Questions that require you to determine whether the provided data is sufficient to answer the problem, without necessarily solving it completely.

Both question types rely heavily on the same pool of math concepts. A strong grasp of the formulas is non-negotiable, especially because Data Sufficiency often rewards efficient reasoning rather than heavy calculation. Having a ready reference – your own *GMAT Math Formulas Cheat Sheet*– helps you quickly recall the right tools for each scenario.

Arithmetic Formulas

Arithmetic is the foundation of the GMAT Quant section. You'll be tested on operations with integers, fractions, decimals, percents, ratios, and properties of numbers.

Number Properties

- Even + Even = Even; Odd + Odd = Even; Even + Odd = Odd
- Even × Even = Even; Odd × Odd = Odd; Even × Odd = Even
- Divisibility rules (e.g., a number is divisible by 3 if the sum of its digits is divisible by 3)
- Prime numbers: only divisible by 1 and themselves (e.g., 2, 3, 5, 7, 11, 13, 17, 19, 23, 29)

Fractions and Decimals

- Adding/Subtracting: Find common denominator
- Multiplying: Multiply numerators, multiply denominators. Simplify if possible.
- Dividing: Multiply by the reciprocal of the second fraction.
- Percent to Decimal: Move decimal two places left (e.g., 45% = 0.45)

- Percent Change: (New Value – Old Value) / Old Value × 100%

Ratios and Proportions

- If a/b = c/d, then ad = bc (cross-multiplication)
- Ratio of two quantities: a:b can be written as a/b
- To combine multiple ratios (e.g., a:b and b:c), make the common term (b) the same

Exponents and Roots

- am × an = am+n
- am / an = am-n
- (am)n = am×n
- a0 = 1 (a "` 0)
- " (a × b) = " a × " b (for non-negative a,b)
- " (a / b) = " a / " b (b "` 0)

These arithmetic rules appear constantly in GMAT problems, so include them prominently in your **GMAT Math Formulas Cheat Sheet**.

Algebra Formulas

Algebra on the GMAT ranges from solving linear and quadratic equations to manipulating inequalities and functions.

Linear Equations

- Slope-intercept form: y = mx + b (m = slope, b = y-intercept)
- Point-slope form: y – y • = m(x – x •)
- Slope: (y , – y •) / (x , – x •)
- Midpoint: ((x •+x ,)/2 , (y •+y ,)/2)
- Distance between two points: " [(x , – x •)² + (y , – y •)²]

Quadratic Equations

- General form: ax² + bx + c = 0
- Quadratic formula: x = [–b ± " (b² – 4ac)] / (2a)
- Discriminant: 9B Ò +" b F 2 " –b ” > 0 two real roots; if 9B Ò öæR &V Â &ö÷C° if 9@
- Factoring patterns:

  (x + y)² = x² + 2xy + y²
- (x – y)² = x² – 2xy + y²
- (x + y)(x – y) = x² – y²

Inequalities

- When multiplying or dividing by a negative number, flip the inequality sign.
- To solve absolute value inequalities: |x| a !’ x a

Functions and Sequences

- Arithmetic sequence: a ™ = a • + (n – 1)d
- Geometric sequence: a ™ = a • × r^(n – 1)
- Sum of arithmetic series: S = n/2 × (first + last)
- Sum of geometric series (finite): S = a •(1 – r •) / (1 – r) for r "` 1

Algebra is often the backbone of GMAT problem solving and data sufficiency. Knowing these formulas by heart will save you precious minutes.

Geometry Formulas

Geometry on the GMAT covers lines, angles, triangles, circles, quadrilaterals, and 3D shapes. There are no proofs – only application of formulas.

Lines and Angles

- Vertical angles are equal.
- Corresponding angles in parallel lines are equal. Alternate interior angles are equal.
- Sum of interior angles in a polygon with n sides: (n – 2) × 180°

Triangles

- Area: (1/2) × base × height
- Right triangle – Pythagorean Theorem: $a^2 + b^2 = c^2$
- Special right triangles:

  30°-60°-90°: sides in ratio x : x" 3 : 2x
- 45°-45°-90°: sides in ratio x : x : x" 2

Quadrilaterals

- Square: area = side^2; perimeter = 4 × side
- Rectangle: area = length × width; perimeter = 2(l + w)
- Parallelogram: area = base × height
- Trapezoid: area = (1/2) × (base • + base ,) × height

Circles

- Circumference = 2< " ÷" Àd
- Area = < +
- Arc length: (;,ó3c ’ r #Àr
- Sector area: (;,ó3c ’ r Àr^2
- Equation of a circle (coordinate geometry): $(x – h)^2 + (y – k)^2 = r^2$, where (h,k) is center

3D Shapes

- Rectangular solid: volume = l × w × h; surface area = 2(lw + lh + wh)
- Cube: volume = s^3; surface area = $6s^2$
- Cylinder: volume = < +&ƒ ° surface area = 2< +" ² #Àrh
- Sphere: volume = (4/3)< +3° surface area = 4< +

Geometry problems often involve multiple steps, so your **GMAT Math Formulas Cheat Sheet**should have these ready for rapid recall.

Statistics, Probability, and Combinatorics

These topics are common in the GMAT and require formulas that are easy to mix up. Let’s break them down.

Descriptive Statistics

- Mean (Average): sum of terms / number of terms
- Median: middle value when sorted (if even count, average of two middle values)
- Mode: most frequent value
- Range: max – min
- Standard Deviation: measure of spread; for GMAT, know that adding a constant to all terms does not change

SD, but multiplying all terms by a constant multiplies SD by that constant

Probability

- P(event) = number of favorable outcomes / total possible outcomes
- P(A or B) = P(A) + P(B) – P(A and B) for non-mutually exclusive events
- P(A and B) = P(A) × P(B) for independent events
- P(not A) = 1 – P(A)

Combinatorics

- Factorial: n! = n × (n-1) × ... × 1
- Permutations (order matters): P(n, r) = n! / (n – r)!
- Combinations (order does not matter): C(n, r) = n! / [r! (n – r)!]

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