24 SAT Math Formulas
You Need to Know!

Math with Ryan · Ryan Krug, SAT prep instructor, Tampa, FL · Print it, pin it, know it cold.



1 Slope

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

Rise over run between two points. From (1, 2) to (3, 6): m = 4/2 = 2.

2 Slope-Intercept Form

$$y = mx + b$$

m = slope, b = y-intercept. The fastest way to graph a line.

3 Point-Slope Form

$$y - y_1 = m(x - x_1)$$

Build a line from one point and the slope.

4 Midpoint

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

Just average the x's and average the y's.

5 Distance

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

The Pythagorean theorem in disguise.

6 Parallel & Perpendicular

Parallel: same slope · Perp.: opposite reciprocals

Slopes 2 and −1/2 are perpendicular.

7 Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Solves any quadratic set equal to 0.

8 Discriminant

$$D = b^2 - 4ac$$

D > 0, 2 real solutions · D = 0, 1 real solution · D < 0, no real solutions.

9 Vertex Form

$$y = a(x - h)^2 + k$$

Vertex is (h, k). Watch the sign of h.

10 Vertex x-Coordinate

$$x = -b / 2a$$

The axis of symmetry — plug back in for the vertex y.

11 Difference of Squares

$$a^2 - b^2 = (a + b)(a - b)$$

$x^2 - 25 = (x + 5)(x - 5)$. A factoring favorite.

12 Exponent Rules

$$x^a \cdot x^b = x^{a+b} \cdot (x^a)^b = x^{ab} \cdot x^{-a} = 1/x^a$$

Add exponents when multiplying same bases.

13 Radicals as Exponents

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

$\sqrt[3]{(x^2)} = x^{2/3}$. Root becomes the denominator.

14 Exponential Growth & Decay

$$y = a(1 + r)^t \text{ / } y = a(1 - r)^t$$

a = starting amount, r = rate per period.

15 Percent Change

$$(\text{new} - \text{old}) / \text{old} \times 100\%$$

Always divide by the ORIGINAL amount.

16 Mean & Median

Mean = sum / count

Median = middle value when ordered. Mean questions often hide the total.

17 Probability

favorable / total outcomes

"Or" adds (if no overlap); "and" multiplies (if independent).

18 Circle Equation

$$(x - h)^2 + (y - k)^2 = r^2$$

Center (h, k), radius r. Complete the square to find them.

19 Arc Length & Sector Area

$$(\theta/360°) \times 2\pi r \cdot (\theta/360°) \times \pi r^2$$

Both are just the fraction θ/360° of the whole circle.

20 Pythagorean Theorem

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

Triples to spot fast: 3-4-5, 5-12-13, 8-15-17.

21 Special Right Triangles

45-45-90: x, x, x√2 · 30-60-90: x, x√3, 2x

No trig needed — just scale the pattern.

22 Equilateral Triangle Area

$$(s^2\sqrt{3}) / 4$$

s = side length. Comes from the 30-60-90 split.

23 Sum of Interior Angles

$$(n - 2) \times 180°$$

n = number of sides. Pentagon: 3 × 180° = 540°.

24 SOH-CAH-TOA

sin = opp/hyp · cos = adj/hyp · tan = opp/adj

Plus: $\sin^2 x + \cos^2 x = 1$, and $\sin(x°) = \cos((90-x)°)$.

More free resources: ryantkrug-sys.github.io · SAT is a registered trademark of the College Board, which does not endorse this product.