

Key SAT Algebra Formulas

Lines & Linear Growth

Standard Form

$$Ax + By = C$$

Point-Slope Form

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

m = slope

Slope-Intercept Form

$$y = mx + b$$

m = slope

b = y-intercept

Slope

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

X-intercept

Where the line crosses the x-axis; where $y = 0$.

Y-intercept

Where the line crosses the y-axis; where $x = 0$.

Parallel lines

...have the same slope. Ex. $y = 2x + 5$; $y = 2x - 7$

Perpendicular lines

...have negative reciprocal slopes.

Ex. $y = 2x + 5$; $y = -\frac{1}{2}x + 5$

Key SAT Advanced Math Formulas

Quadratic Equations

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

← discriminant

Quadratic Equation

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

Vertex Form

$$y = ax^2 + bx + c$$

Standard Form

$$x = -\frac{b}{2a}$$

Vertex of the Parabola

Substitute in this value of x to find the y coordinate.

Factoring Polynomials

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

Square of a Sum

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

Square of a Difference

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

Difference of Squares

Radicals & Exponents

$$x^a x^b = x^{a+b}$$

Product Rule

$$x^{1/a} = \sqrt[a]{x}$$

Fractional Exponent Rule

$$x^0 = 1$$

Zero Power Rule

$$(x^a)^b = x^{ab}$$

Power of a Power Rule

$$f(x) = a \times b^x$$

Exponential Function

...when $b > 0$
and $a \neq 0$.

$$x^{-a} = \frac{1}{x^a}$$

Negative Power Rule

$$\frac{x^a}{x^b} = x^{a-b}$$

Quotient Rule

$$f(x) = a(1+r)^t / f(x) = a(1-r)^t$$

Exponential Growth / Exponential Decay

a : the initial amount

r : the growth rate

t : time

$$\sqrt[n]{\frac{x}{z}} = \frac{\sqrt[n]{x}}{\sqrt[n]{z}}$$

Division Property

$$\sqrt[n]{xy} = \sqrt[n]{x} \sqrt[n]{y}$$

Multiplication Property

$$\sqrt[n]{x^m} = x^{m/n}$$

Radical to Exponent

Key SAT Problem-Solving & Data Analysis Formulas

Statistics

Mean

$$\text{Average} = \frac{\text{Sum of the terms}}{\text{Number of terms}}$$

Median

The middle of the values in a list.

Mode

The value that appears most often in a list.

Range

The difference between the greatest and lowest values.

Standard
Deviation

How far values deviate from the mean.

Data Analysis

$$\frac{\text{Part}}{\text{Whole}} = \frac{\%}{100}$$

Percentage Formula

$$\frac{\# \text{ desired outcomes}}{\# \text{ possible outcomes}}$$

Probability Formula

$$I = PRT$$

Basic Interest Rate Formula

I: Interest *R*: Rate

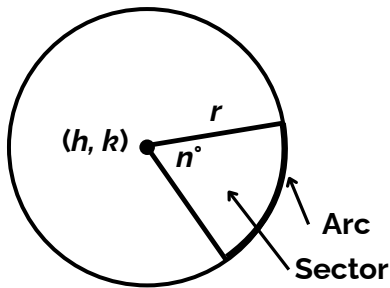
P: Principal *T*: Time

Key SAT Geometry & Trigonometry Formulas

Geometry

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

Equation of a Circle

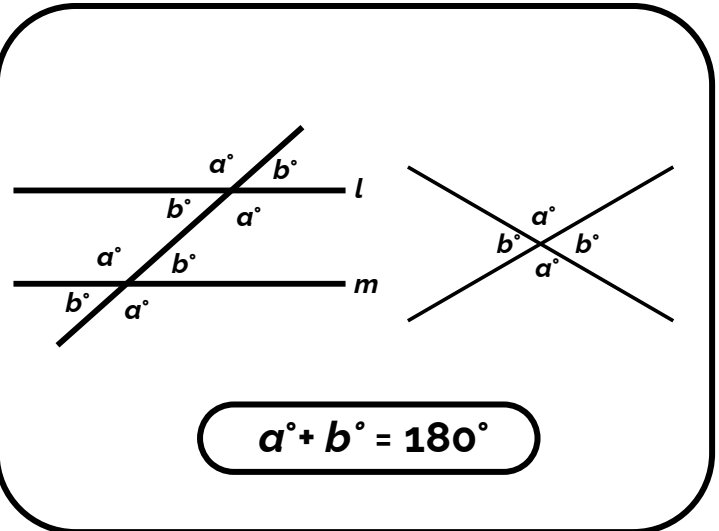


$$(n^\circ / 360^\circ) \times 2\pi r$$

Length of the Arc

$$(n^\circ / 360^\circ) \times \pi r^2$$

Area of the Sector



$$a^\circ + b^\circ = 180^\circ$$

Trigonometry

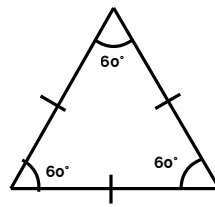
"SOHCAHTOA"

$$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

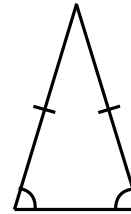
$$\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$$

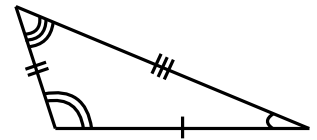
Types of Triangles



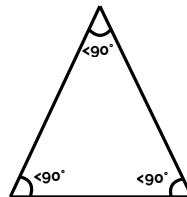
equilateral



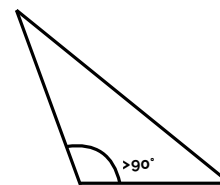
isosceles



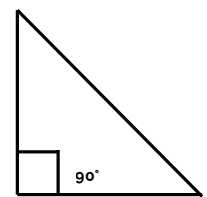
scalene



acute



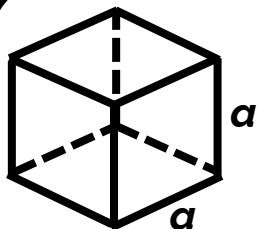
obtuse



right

Key SAT Geometry & Trigonometry Formulas

Surface Area



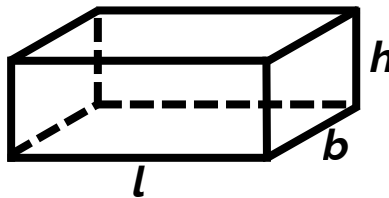
cube

$$6a^2$$

total

$$4a^2$$

lateral



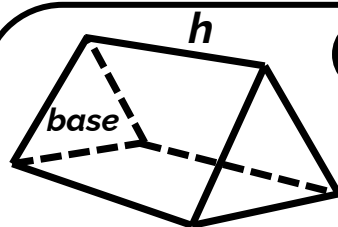
rectangular prism

$$2(lb + bh + hl)$$

total

$$2h(l + b)$$

lateral



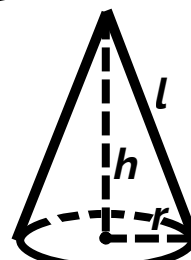
triangular prism

$$\text{lat. SA} + 2(\text{base area})$$

total

$$\text{base perimeter} \times h$$

lateral



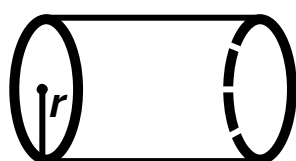
cone

$$\pi r^2 + \pi r l$$

total

$$\pi r l$$

lateral



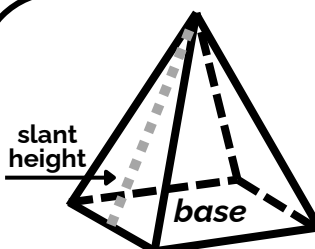
cylinder

$$2\pi r^2 + \pi r h$$

total

$$2\pi r h$$

lateral



pyramid

$$\text{lat. SA} + \text{base area}$$

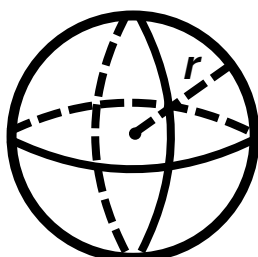
total

$$\frac{1}{2} (\text{base perimeter}) \times \text{slant height}$$

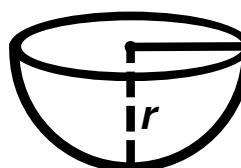
lateral

$$4\pi r^2$$

total



sphere



hemisphere

$$3\pi r^2$$

total

$$2\pi r^2$$

lateral