

SAT PREP

Heart of Algebra

Standard Form: $Ax + By = C$

Point-Slope Form: $(y - y_1) = m(x - x_1)$

Slope-Intercept Form: $y = mx + b$

Slope of a Line: $m = \frac{y_2 - y_1}{x_2 - x_1}$

Midpoint: $M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$

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

Average Velocity: $V_{avg} = \frac{\text{total distance}}{\text{total time}}$

Problem Solving and Data Analysis

General Form: $A = P(1 \pm r)^t$

Continuous Growth/Decay: $A = Pe^{rt}$

Compounding Growth/Decay: $A = P \left(1 \pm \frac{r}{n} \right)^{nt}$

Arithmetic Mean: $\frac{\text{Sum of the Terms}}{\text{Number of Terms}}$

Percent Change: $\frac{\text{New} - \text{Old}}{\text{Old}} \times 100\%$

Exclusive OR: $P(A \text{ or } B) = P(A) + P(B) - P(A \& B)$

Conditional Probability: $P(A|B) = \frac{P(A \& B)}{P(B)}$

Passport to Advanced Math

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

Vertex of Parabola: $x = \frac{-b}{2a}$

Equation of a circle with center (h, k) and radius r:

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

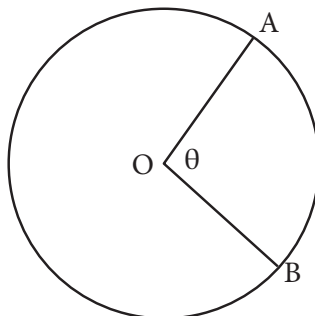
Additional Topics in Math

Area: $A = \pi r^2$

Circumference: $C = 2\pi r$

Arc length (in degrees): $L(A, B) = \frac{\theta}{360^\circ} \cdot 2\pi r$

Sector Area (in degrees): $AOB = \frac{\theta}{360^\circ} \cdot \pi r^2$



Parallelogram: $A = bh$

Trapezoid: $A = \frac{1}{2}(b_1 + b_2)h$

Triangle: $A = \frac{1}{2}bh$

Regular Polygon: $A = \frac{1}{2}aP$ or $A = \frac{ns^2}{4\tan(\frac{180^\circ}{n})}$

Cube: $SA = 6s^2$

Cube: $V = s^3$

Rectangular Prism: $V = lwh$

Cylinder: $V = \pi r^2h$

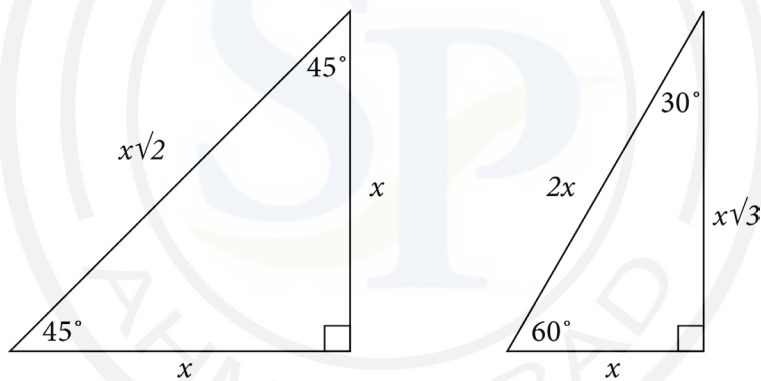
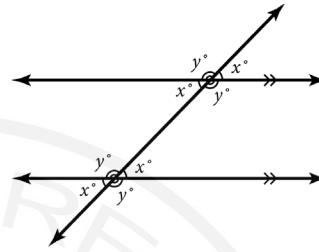
Sphere: $V = \frac{4}{3}\pi r^3$

Sum of Interior Angles: $= 180(n - 2)^\circ$

Each Interior Angle: $= \frac{180(n - 2)^\circ}{n}$

Sum of Exterior Angles: $= 360^\circ$

Each Exterior Angles: $= \frac{360^\circ}{n}$



Trig Ratios

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

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

$$\tan x = \frac{\sin x}{\cos x} = \frac{\text{opposite}}{\text{adjacent}}$$

$$\csc x = \frac{1}{\sin x} = \frac{\text{hypotenuse}}{\text{opposite}}$$

$$\sec x = \frac{1}{\cos x} = \frac{\text{hypotenuse}}{\text{adjacent}}$$

$$\cot x = \frac{1}{\tan x} = \frac{\cos x}{\sin x} = \frac{\text{adjacent}}{\text{opposite}}$$

Pythagorean Identities

$$\sin^2 x + \cos^2 x = 1$$

$$\tan^2 x + 1 = \sec^2 x$$

$$1 + \cot^2 x = \csc^2 x$$