

SAT FORMULA SHEET

Heart of Algebra

Lines General

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

Problem Solving and Data Analysis

Growth and Decay Statistics and Probability

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

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

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

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

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

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

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

Passport to Advanced Math

Quadratics $(ax^2 + bx + c)$ Equations of Circles

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

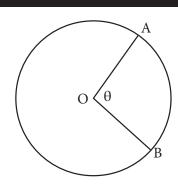
The Circle

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):
$$AOB = \frac{\theta}{360^{\circ}} \cdot \pi r^2$$



Areas

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:
$$SA = 6s^2$$

Volumes

Cube: $V = s^{3}$

Rectangular Prism: V = lwh

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

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

Angles

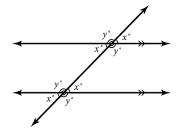
Sum of Interior Angles: = $180(n - 2)^{\circ}$

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

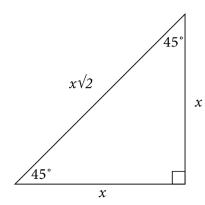
Sum of Exterior Angles: = 360°

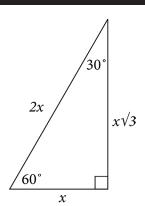
Each Exterior Angles: =
$$\frac{360^{\circ}}{n}$$

Angles and Parallel Lines



Special Right Triangles





Trigonometry: $cos(90^{\circ} - x) = sin x$

Trig Ratios

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

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

$$\tan x = \frac{\sin x}{\cos x} = \frac{opposite}{hypotenuse}$$

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

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

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

Pythagorean Identities

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

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

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