CRAM CREW

SAT FORMULA SHEET

Heart of Algebra

Lines

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

General

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

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

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

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

Statistics and Probability

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

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

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

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

Passport to Advanced Math

Quadratics ($ax^2 + bx + c$)

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

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

Equations of Circles

Equation of a circle with center (h, k) and radius r:
$(x - h)^2 + (y - k)^2 = r^2$

Additional Topics in Math

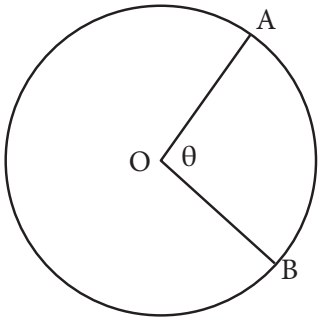
The Circle

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 $A = \frac{ns^2}{4\tan\left(\frac{180^\circ}{n}\right)}$

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

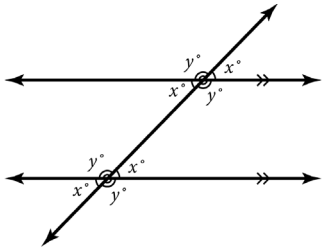
Sum of Interior Angles: $= 180(n - 2)^\circ$

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

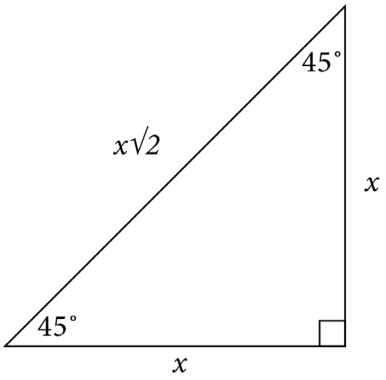
Sum of Exterior Angles: $= 360^\circ$

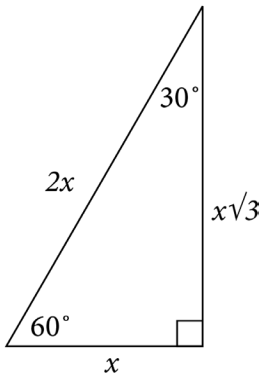
Each Exterior Angles: $= \frac{360^\circ}{n}$

Angles and Parallel Lines



Special Right Triangles





Trigonometry: cos(90° - *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

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

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

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