High School AIMS Reference Sheet

Key

b = base	d = diameter
h = height	r = radius
l = length	ℓ = slant height
w = width	B = area of base
	P = perimeter of base

Use 3.14 or $\frac{22}{7}$ for π.

Formulas for Area

Circle	$A = \pi r^2$
Parallelogram	$A = bh$
Rectangle	$A = lw$
Trapezoid	$A = \frac{1}{2}h(b_1 + b_2)$
Triangle	$A = \frac{1}{2}bh$

Name	Volume (V)	Surface Area (SA)
Pyramid	$V = \frac{1}{3}Bh$	$SA = B + \frac{1}{2}P\ell$
Right Cone	$V = \frac{1}{3}\pi r^2 h$	$SA = \frac{1}{2}(2\pi r)\ell + \pi r^2$ or $SA = \pi r\ell + \pi r^2$
Right Cylinder	$V = \pi r^2 h$	$SA = 2\pi r^2 + 2\pi rh$
Right Prism	$V = Bh$	$SA = 2B + Ph$
Sphere	$V = \frac{4}{3}\pi r^3$	$SA = 4\pi r^2$

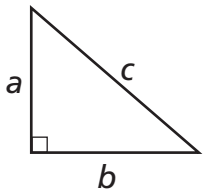
Quadratics

For all quadratics $ax^2 + bx + c = 0$

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

The x-coordinate for the vertex of a quadratic: $\frac{-b}{2a}$

Pythagorean Theorem



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

Arithmetic Sequences

Explicit formula for an arithmetic sequence:
$A_n = A_1 + d(n - 1)$
d = common difference

Interest Formulas

I = interest earned, P = principal,
r = annual interest rate, t = time in years,
n = number of times compounded per year,
A = total amount after time t

Simple Interest: $I = Prt$

$A = P(1 + rt)$

Compound Interest: $A = P\left(1 + \frac{r}{n}\right)^{nt}$

Coordinate Geometry and Linear Equation Forms

Given: Points $S(x_1, y_1), T(x_2, y_2)$

Distance between two points:

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

Midpoint between two points:

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

Slope of line through two points:

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

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

Standard or General Form: $Ax + By = C$

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

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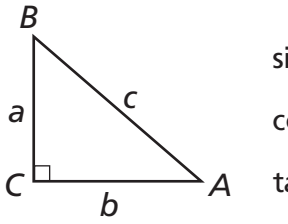
Additional Formulas

Distance, Rate, Time Formula: d = distance, r = rate, t = time $d = rt$	Sum of the measures of the interior angles of a convex polygon with n sides: $S = (n-2)(180°)$
Permutations of n objects taken r at a time: $_nP_r = \frac{n!}{(n-r)!}$	Combinations of n objects taken r at a time: $_nC_r = \frac{n!}{(n-r)!\,r!}$
Area of a sector: $A = \pi r^2\left(\frac{\text{degrees in corresponding arc}}{360°}\right)$	Length of a circular arc: Length of $\overset{\frown}{AB} = 2\pi r\left(\frac{m\overset{\frown}{AB}}{360°}\right)$
Circumference: $C = \pi d$ or $C = 2\pi r$	Area of a circle: $A = \pi r^2$

Right-Triangle Relationships

Trigonometric Ratios

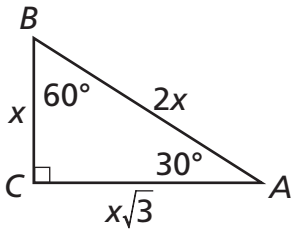


$\sin A = \frac{a}{c}$

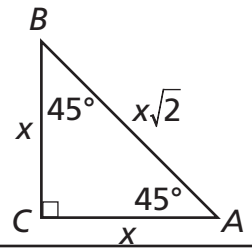
$\cos A = \frac{b}{c}$

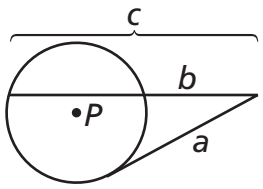
$\tan A = \frac{a}{b}$

30°–60°–90° Triangle Relationships

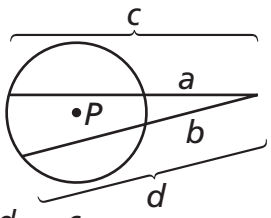


45°–45°–90° Triangle Relationships

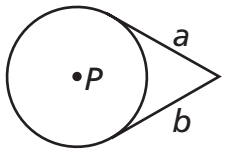




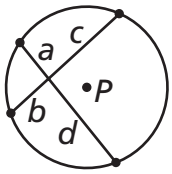
$\frac{c}{a} = \frac{a}{b}$ or $a^2 = bc$



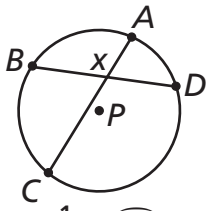
$\frac{d}{a} = \frac{c}{b}$ or $ac = bd$



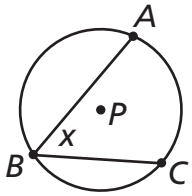
$a = b$



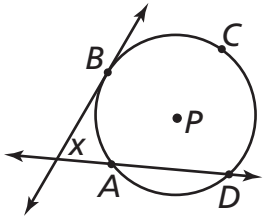
$\frac{a}{b} = \frac{c}{d}$ or $ad = bc$



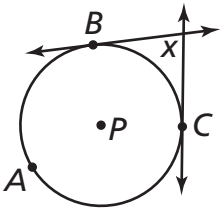
$m\angle x = \frac{1}{2}(m\overset{\frown}{AB} + m\overset{\frown}{CD})$



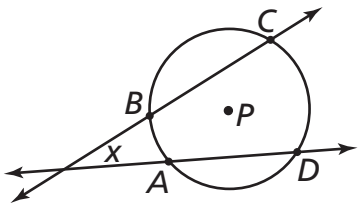
$m\angle x = \frac{1}{2}m\overset{\frown}{AC}$



$m\angle x = \frac{1}{2}(m\overset{\frown}{BCD} - m\overset{\frown}{AB})$



$m\angle x = \frac{1}{2}(m\overset{\frown}{BAC} - m\overset{\frown}{BC})$



$m\angle x = \frac{1}{2}(m\overset{\frown}{CD} - m\overset{\frown}{AB})$