Mathematics Reference Sheet

Volume

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

Pyramid: $V = \frac{1}{3}Bh$

Cone: $V = \frac{1}{3}\pi r^2 h$

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

Coordinate Geometry

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

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

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

Special Factoring

$a^2 - b^2 = (a - b)(a + b)$
$a^2 + 2ab + b^2 = (a + b)^2$
$a^2 - 2ab + b^2 = (a - b)^2$
$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$
$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

Quadratic Formula

For $ax^2 + bx + c = 0$,
$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Interest

Simple interest Formula:
$I = prt$

Interest Formula (compounded n times per year):
$A = p\left(1 + \frac{r}{n}\right)^{nt}$

A = Amount after t years.
p = principal
r = annual interest rate
t = time in years
I = Interest

Trigonometric Identities

Pythagorean Theorem: $a^2 + b^2 = c^2$

$\sin\theta = \frac{opp}{hyp}$

$\cos\theta = \frac{adj}{hyp}$

$\tan\theta = \frac{opp}{adj}$

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

$Density = \frac{Mass}{Volume}$

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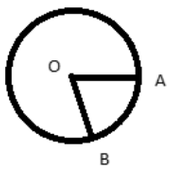
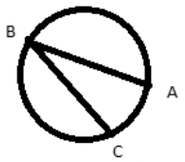
1 2 3 4 5 6 7 8 9 IPK 16 15 14 13

Central Angle



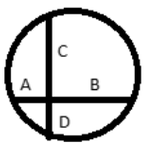
$m\angle AOB = m\widehat{AB}$

Inscribed Angle



$m\angle ABC = \frac{1}{2}m\widehat{AC}$

Intersecting Chords Theorem



$A \cdot B = C \cdot D$

Probability

Permutations: $_nP_r = \frac{n!}{(n-r)!}$

Combinations: $_nC_r = \frac{n!}{(n-r)!r!}$

Multiplication rule (independent events): $P(A \text{ and } B) = P(A) \cdot P(B)$

Multiplication rule (general): $P(A \text{ and } B) = P(A) \cdot P(B|A)$

Addition rule: $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

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

Arithmetic Sequence: $a_n = a_1 + (n-1)d$ where a_n is the nth term, a_1 is the first term, and d is the common difference.

Geometric Sequence: $a_n = a_1 r^{(n-1)}$ where a_n is the nth term, a_1 is the first term, and r is the common ratio.