

MIDDLE GRADE MATHEMATICS FORMULAS AND NOTATION

Formula	Description
$V = \frac{1}{3} Bh$	Volume of a right cone and a pyramid
$A = 4\pi r^2$	Surface area of a sphere
$V = \frac{4}{3} \pi r^3$	Volume of a sphere
$A = \pi r \sqrt{r^2 + h^2}$	Lateral surface area of a right circular cone
$S_n = \frac{n}{2} [2a + (n-1)d] = n \left(\frac{a + a_n}{2} \right)$	Sum of an arithmetic series
$S_n = \frac{a(1 - r^n)}{1 - r}$	Sum of a geometric series
$\sum_{n=0}^{\infty} ar^n = \frac{a}{1 - r}, r < 1$	Sum of an infinite geometric series
$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$	Distance formula
$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$	Midpoint formula
$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$	Law of sines
$c^2 = a^2 + b^2 - 2ab \cos C$	Law of cosines
$s^2 = \frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n - 1}$	Variance
$s = r\theta$	Arc length
$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	Quadratic formula
\bar{A} is the complement of set A	Set theory
${}_n P_r = P(n,r) = \frac{n!}{(n-r)!}$	
${}_n C_r = C(n,r) = \frac{n!}{(n-r)!r!}$	