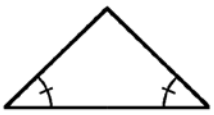
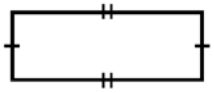
Definitions and Formulas for Middle Level/Intermediate Mathematics

Notation	Description
$a \rightarrow b$	a implies b
$a \leftrightarrow b$	a if and only if b
$a \wedge b$	a and b
$a \vee b$	a or b
$\sim a$	not a
$A \cup B$	A union B
$A \cap B$	A intersect B
$\overline{A}$	complement of A
U	universal set
$\{\,\}$	empty set
$i = \sqrt{-1}$	imaginary unit
$\overline{z}$	complex conjugate of z
A^{-1}	inverse of matrix A
$\vec{v}$	vector v
$\sim$	is similar to
$\cong$	is congruent to
	congruent angles
	congruent sides
	parallel lines

(*continued on next page*)

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
$S_n = \frac{n}{2}[2a + (n-1)d] = n\left(\frac{a + a_n}{2}\right)$	sum of an arithmetic series
$S_n = \frac{a(1 - r^n)}{1 - r}$	sum of a geometric series
$\sum_{n=0}^{\infty} ar^n = \frac{a}{1 - r}, \lvert r\rvert < 1$	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
$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$	slope
$y = ax^2 + bx + c$	parabola
$s^2 = \frac{\sum_{i=1}^{n} (x_i - \overline{x})^2}{n - 1}$	variance
$s = r\theta$	arc length
$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	quadratic formula
${}_nC_r = \frac{n!}{r!(n - r)!}$	combinations
${}_nP_r = \frac{n!}{(n - r)!}$	permutations

Formula	Description
$\sin\theta = \frac{\text{opp}}{\text{hyp}}$	sine of θ in a right triangle
$\cos\theta = \frac{\text{adj}}{\text{hyp}}$	cosine of θ in a right triangle
$\tan\theta = \frac{\text{opp}}{\text{adj}}$	tangent of θ in a right triangle

END OF DEFINITIONS AND FORMULAS