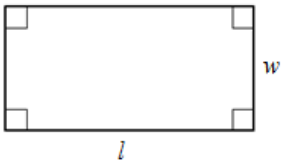
Mathematics Reference Sheet

Perimeter, Area, and Volume Formulas

Rectangle

$A = lw$

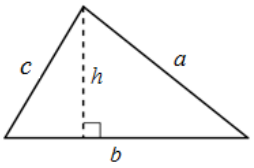
$P = 2l + 2w$



Triangle

$A = \frac{1}{2}bh$

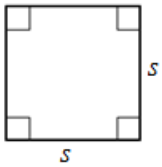
$P = a + b + c$



Square

$A = s^2$

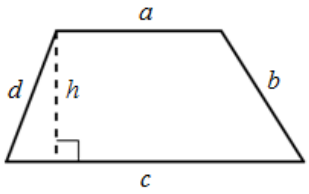
$P = 4s$



Trapezoid

$A = \frac{1}{2}(a + c)h$

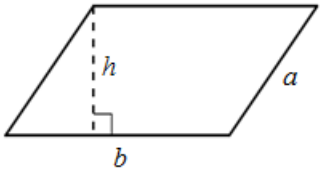
$P = a + b + c + d$



Parallelogram

$A = bh$

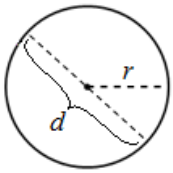
$P = 2a + 2b$



Circle

$A = \pi r^2$

$C = 2\pi r$ or $C = \pi d$



General Right Prism

$V = Bh$

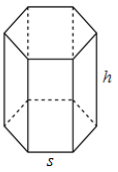
$SA = 2B + Ph$

B is the area of the base and P is the perimeter of the base.

Hexagonal Prism

$V = Bh$

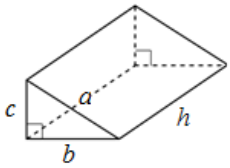
$SA = 2B + 6sh$



Triangular Prism

$V = \frac{1}{2}(bc)h$

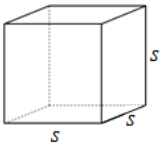
$SA = 2\left[\frac{1}{2}(bc)\right] + h(a + b + c)$



Cube

$V = s^3$

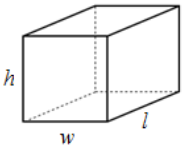
$SA = 6s^2$



Rectangular Prism

$V = lwh$

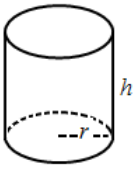
$SA = 2lw + 2lh + 2wh$



Circular Cylinder

$V = \pi r^2 h$

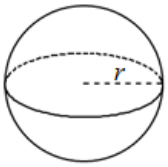
$SA = 2\pi r^2 + 2\pi rh$



Sphere

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

$SA = 4\pi r^2$



General Right Regular Pyramid

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

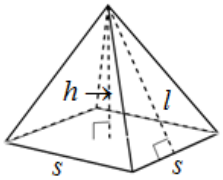
$SA = B + \frac{1}{2}Pl$

B is the area of the base, P is the perimeter of the base and l is the slant height

Square Pyramid

$V = \frac{1}{3}s^2 h$

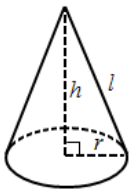
$SA = s^2 + 2sl$



Right Circular Cone

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

$SA = \pi r^2 + \pi rl$



Mathematics Reference Sheet

Algebra Formulas

Slope of a Line

$m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$ where (x_1, y_1) and (x_2, y_2) are points on the line

Distance between Two Points

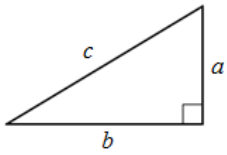
$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ where (x_1, y_1) and (x_2, y_2) are points on a line

Midpoint of a Segment

$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$, where (x_1, y_1) and (x_2, y_2) are the endpoints of the segment

Pythagorean Theorem

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



Angles of a Polygon

The sum of the angles in a triangle is 180°.
The sum of the angles in an n-sided polygon is $180(n-2)$.

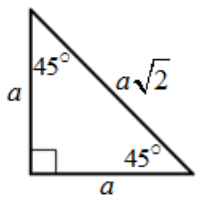
The measure of one interior angle of a regular polygon is $\frac{180(n-2)}{n}$, where *n* is the number of sides.

Simple Interest

$I = prt$; where *I* is interest, *p* is principal, *r* is rate and t is time

Special Right Triangles

$45° - 45° - 90°$ Right Triangle



Linear Equation: Slope Intercept Form

$y = mx + b$, where *m* is the slope and *b* is the *y*-intercept

Linear Equation: Point-Slope Form

$y - y_1 = m(x - x_1)$, where *m* is the slope and (x_1, y_1) is a point on the line

Linear Equation: Standard Form

$Ax + By = C$, where *A*, *B*, and *C* are integers, *A* and *B* are not both zero, and *A* is positive.

Quadratic Formula

If $ax^2 + bx + c = 0$ and $a \neq 0$, then

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

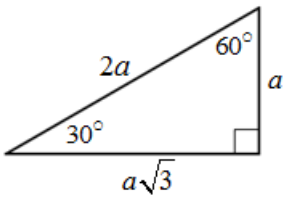
Distance Formula

$d = rt$, $r = \frac{d}{t}$ or $t = \frac{d}{r}$; where *d* is distance, *r* is rate, and *t* is time

Compound Interest

$A = p\left(1 + \frac{r}{n}\right)^{nt}$; where *p* is principal, *r* is annual rate, *n* is the number of compounds per year and *t* is time.

$30° - 60° - 90°$ Right Triangle



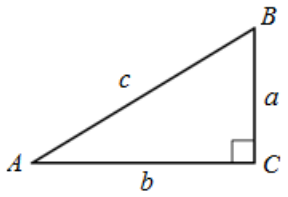
Mathematics Reference Sheet

Trigonometry Formulas

$\sin A = \frac{a}{c} = \frac{\text{opposite side}}{\text{hypotenuse}}$

$\cos A = \frac{b}{c} = \frac{\text{adjacent side}}{\text{hypotenuse}}$

$\tan A = \frac{a}{b} = \frac{\text{opposite side}}{\text{adjacent side}}$



$\csc A = \frac{c}{a} = \frac{\text{hypotenuse}}{\text{opposite side}} = \frac{1}{\sin A}$

$\sec A = \frac{c}{b} = \frac{\text{hypotenuse}}{\text{adjacent side}} = \frac{1}{\cos A}$

$\cot A = \frac{b}{a} = \frac{\text{adjacent side}}{\text{opposite sidea}} = \frac{1}{\tan A}$

Law of Sines

$$\frac{\text{Sin } A}{a} = \frac{\text{Sin } B}{b} = \frac{\text{Sin } C}{c}$$

Law of Cosines

$$c^2 = a^2 + b^2 - 2ab \cos C$$
$$a^2 = b^2 + c^2 - 2bc \cos A$$
$$b^2 = a^2 + c^2 - 2ac \cos B$$

Probability Formulas

$$\text{Probability (event)} = \frac{\text{number of favorable outcomes}}{\text{number of total possible outcomes}}$$

Probability Range is from 0 (impossible) to 1 (certainty)

Independent Events

Outcome of one event does not affect the probability of another.

$$P(A, B) = P(A) \times P(B)$$

Example: What is the probability of getting two heads when tossing 2 coins?

$$P(H, H) = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$$

Dependent Events

Outcome of second event is dependent upon outcome of first event.

$$P(A \text{ and } B) = P(A) \times P(B \mid A)$$

Example: What is the probability of choosing two blue socks from a drawer containing 3 blue socks, 5 red socks, and 2 white socks?

$$P(B \text{ and } B) = \frac{3}{10} \times \frac{2}{9} = \frac{6}{90} = \frac{1}{15}$$