

## Mathematical Formulas

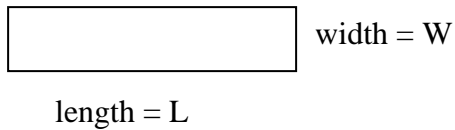
### Algebra:

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

(solution to the quadratic equation  $ax^2 + bx + c = 0$  for the variable  $x$ )

### Common Geometric Shapes and Formulas:

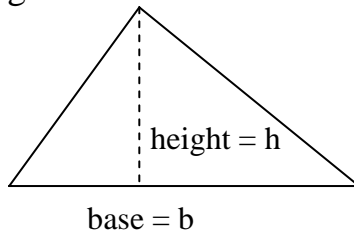
Rectangle:



Perimeter:  $P = 2L + 2W$

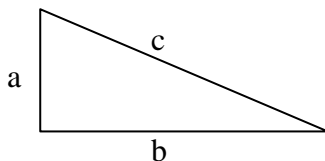
Area:  $A = LW$

Triangle:



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

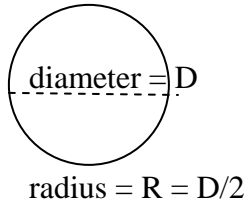
Right Triangle:



Pythagorean Theorem:

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

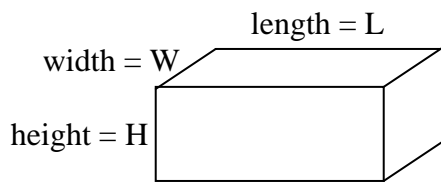
Circle:



Circumference:  $c = \pi D = 2\pi R$

Area:  $A = \pi D^2/4 = \pi R^2$

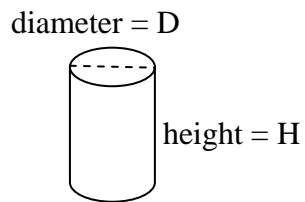
Rectangular Solid:



Surface area:  $A = 2LW + 2LH + 2WH$

Volume:  $V = LWH$

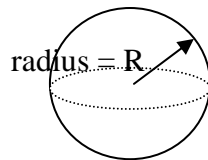
Cylinder:



Surface area:  $A = 2\pi D^2/4 + \pi DH$

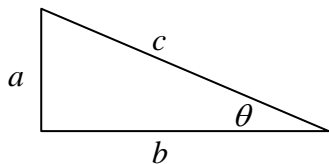
Volume:  $V = \pi D^2 H/4$

Sphere:



Surface area:  $A = \pi D^2 = 4\pi R^2$

Volume:  $V = \frac{4}{3}\pi R^3$

**Trigonometry:****Definitions of Trigonometric Functions:**

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

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

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

**Trigonometric Identities:**

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

$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

$$\sin(\alpha \pm \beta) = \sin \alpha \cos \beta \pm \cos \alpha \sin \beta$$

$$\cos(\alpha \pm \beta) = \cos \alpha \cos \beta \mp \sin \alpha \sin \beta$$

$$\sin 2\theta = 2 \sin \theta \cos \theta$$

$$\begin{aligned} \cos 2\theta &= \cos^2 \theta - \sin^2 \theta \\ &= 2 \cos^2 \theta - 1 \\ &= 1 - 2 \sin^2 \theta \end{aligned}$$

$$\sin(-\theta) = -\sin \theta$$

$$\cos(-\theta) = \cos \theta$$