

## Trigonometry

*Trigonometric Ratios*

$$\sin(\theta) = \frac{\text{opp}}{\text{hyp}}$$

$$\cos(\theta) = \frac{\text{adj}}{\text{hyp}}$$

$$\tan(\theta) = \frac{\text{opp}}{\text{adj}}$$

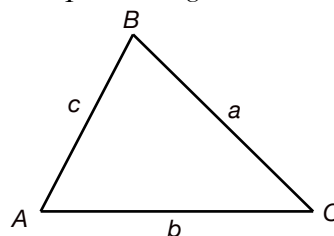
*Arc Trigonometric Ratios*

$$\theta = \sin^{-1}\left(\frac{\text{opp}}{\text{hyp}}\right)$$

$$\theta = \cos^{-1}\left(\frac{\text{adj}}{\text{hyp}}\right)$$

$$\theta = \tan^{-1}\left(\frac{\text{opp}}{\text{adj}}\right)$$

*Oblique Triangles*



*Sine Law*

$$\frac{\sin(A)}{a} = \frac{\sin(B)}{b} = \frac{\sin(C)}{c}$$

$$\frac{a}{\sin(A)} = \frac{b}{\sin(B)} = \frac{c}{\sin(C)}$$

*Cosine Law*

$$a^2 = b^2 + c^2 - 2bc \cdot \cos(A)$$

$$b^2 = a^2 + c^2 - 2ac \cdot \cos(B)$$

$$c^2 = a^2 + b^2 - 2ab \cdot \cos(C)$$

$$A = \cos^{-1}\left[\frac{b^2 + c^2 - a^2}{2bc}\right]$$

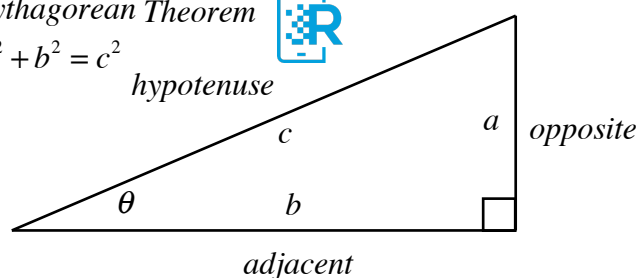
$$B = \cos^{-1}\left[\frac{a^2 + c^2 - b^2}{2ac}\right]$$

$$C = \cos^{-1}\left[\frac{a^2 + b^2 - c^2}{2ab}\right]$$

*Pythagorean Theorem*

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

*hypotenuse*



## Linear Relations

*Slope Formula*

$$m = \frac{\text{rise}}{\text{run}} \text{ or } \frac{y_2 - y_1}{x_2 - x_1}$$

*Direct Linear Relation*

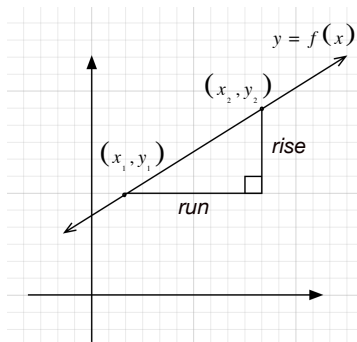
$$y = mx$$

*Partial Linear Relation*

$$y = mx + b$$

*Distance Formula*

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



## Geometry

$$\text{Sum of Angles in a Polygon} = (n - 2) \times 180^\circ$$

$$\text{Corner Angle in a Regular Polygon} = \frac{(n - 2) \times 180^\circ}{n}$$

$$\text{Central Angle of a Polygon} = \frac{360^\circ}{n}$$

## Tolerance

$$\text{Nominal Value} \pm \frac{1}{2}(\text{Tolerance})$$

$$\text{Minimum Value}_{-0}^{+ \text{tolerance}}$$

$$\text{Maximum Value}_{- \text{tolerance}}^{+0}$$

## Probability & Statistics

$$\text{Mean: } \bar{x} = \frac{\text{Sum of Values}}{\text{Number of Values}}$$

$$\text{Probability: } P(A) = \frac{\text{Occurrences of Event A}}{\text{Total Possible Outcomes}}$$

$$\text{Odds in Favour} = \text{Favourable Outcomes} : \text{Unfavourable Outcomes}$$

$$\text{Odds Against} = \text{Unfavourable Outcomes} : \text{Favourable Outcomes}$$

$$\text{Percentile Ranking: } PR = \frac{b}{n} \times 100$$

## Compound Interest

$$A = P \left( 1 + \frac{r}{n} \right)^{nt}$$

*A = Final Amount (\$)*  
*P = Principle Investment (\$)*  
*r = Annual Interest Rate (%)*  
*n = Compounds Per Year*  
*t = Time in years*

# 2D Shapes

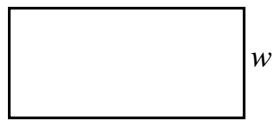
**Square**



$$\text{Area} = l^2$$

$$\text{Perimeter} = 4l$$

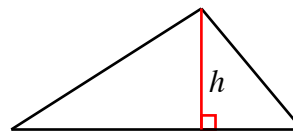
**Rectangle**



$$\text{Area} = lw$$

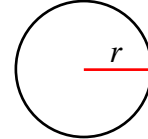
$$\text{Perimeter} = 2l + 2w$$

**Triangle**



$$\text{Area} = \frac{1}{2}bh$$

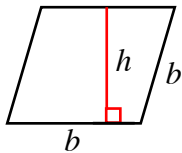
**Circle**



$$\text{Area} = \pi r^2$$

$$\text{Circumference} = 2\pi r$$

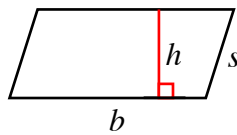
**Rhombus**



$$\text{Area} = bh$$

$$\text{Perimeter} = 4b$$

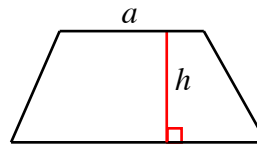
**Parallelogram**



$$\text{Area} = bh$$

$$\text{Perimeter} = 2b + 2s$$

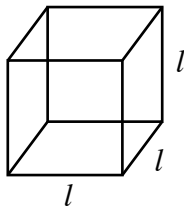
**Trapezoid**



$$\text{Area} = \left( \frac{a+b}{2} \right) h$$

# 3D Objects

**Cube**

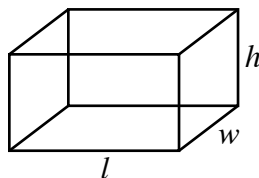


$$\text{Volume} = l^3$$

$$\text{TSA} = 6l^2$$

$$\text{LSA} = 4l^2$$

**Rectangular Prism**

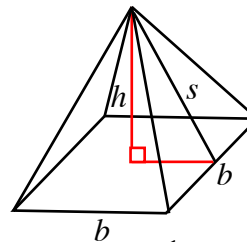


$$\text{Volume} = lwh$$

$$\text{TSA} = 2lw + 2lh + 2wh$$

$$\text{LSA} = 2lh + 2wh$$

**Square Pyramid**

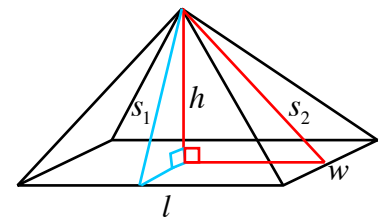


$$\text{Volume} = \frac{1}{3}b^2h$$

$$\text{TSA} = b^2 + 2bs$$

$$\text{LSA} = 2bs$$

**Rectangular Pyramid**

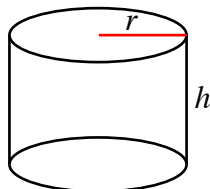


$$\text{Volume} = \frac{1}{3}lwh$$

$$\text{TSA} = lw + ls_1 + ws_2$$

$$\text{LSA} = ls_1 + ws_2$$

**Cylinder**

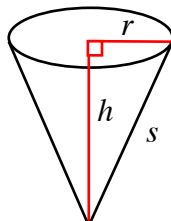


$$\text{Volume} = \pi r^2 h$$

$$\text{TSA} = 2\pi r^2 + 2\pi rh$$

$$\text{LSA} = 2\pi rh$$

**Cone**

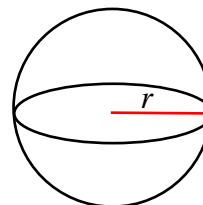


$$\text{Volume} = \frac{1}{3}\pi r^2 h$$

$$\text{TSA} = \pi r^2 + \pi rs$$

$$\text{LSA} = \pi rs$$

**Sphere**



$$\text{Volume} = \frac{4}{3}\pi r^3$$

$$\text{TSA} = 4\pi r^2$$

Virtually Enhanced With  
(download app and aim at images)



AUGMENT



hp REVEAL