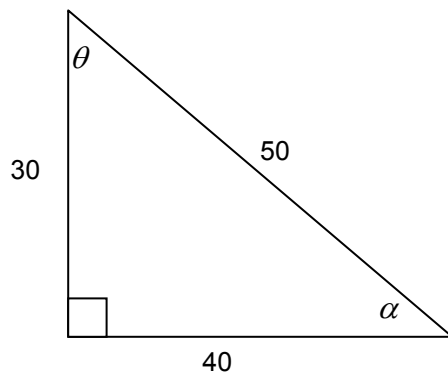


Physics is very heavily dependent on math. Therefore, it is very important to become reacquainted with some basic math concepts.

Trigonometry

$$\sin \theta = \frac{\text{opp}}{\text{hyp}}, \quad \cos \theta = \frac{\text{adj}}{\text{hyp}}, \quad \tan \theta = \frac{\text{opp}}{\text{adj}} \quad \text{or remember } \mathbf{sohcahtoa}.$$



$$\sin \theta = \frac{40}{50}$$

$$\sin \alpha = \frac{30}{50}$$

$$\cos \theta = \frac{30}{50}$$

$$\cos \alpha = \frac{40}{50}$$

$$\tan \theta = \frac{40}{30}$$

$$\tan \alpha = \frac{30}{40}$$

Sine Law and Cosine Law

Sine Law

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

Cosine Law

$$c^2 = a^2 + b^2 - 2ab \cos(C) \text{ or}$$

$$a^2 = c^2 + b^2 - 2cb \cos(A) \text{ or}$$

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

Proportioning

One very useful tool in physics is proportioning. The advantage of proportioning is that one needs very little information to solve a question.

Example: If the gravitational attraction between two bodies was 4N, what would happen to the force if the mass of one body was tripled and the distance between them cut in half?

<u>Proportion 1</u>	<u>Proportion 2</u>
$F_{g_1} = \frac{Gm_a m_b}{r^2}$ <p>where $F_{g_1} = 4N$</p>	$F_{g_2} = \frac{G(3m_a)m_b}{(\frac{1}{2}r)^2}$ $F_{g_2} = \frac{3Gm_a m_b}{\frac{1}{4}r^2}$ $F_{g_2} = \frac{4}{1} \cdot \frac{3Gm_a m_b}{r^2}$ $F_{g_2} = 12 \frac{Gm_a m_b}{r^2}$
	$F_{g_2} = 12F_{g_1}$ $F_{g_2} = 12 \times 4N$ $= 48N$ <p>\therefore the force is 48N</p>