

Math Review!

Requirements

- Scientific Calculator
- Ruler
- Colour pencils

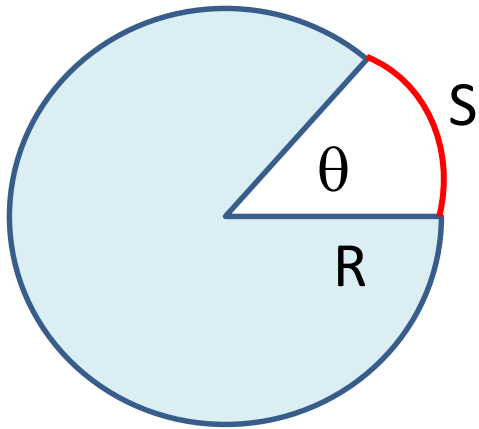
Unit Conversion

- Given units not always useful or correct for a given formula
- e.g. 60 mi/h in kinematics should be in m/s
- Need conversion factors
 - 1 h = 3600 s (probably know this)
 - 1 mi = 1609 m (probably look up – see text)

$$60 \frac{mi}{h} = 60 \frac{mi}{h} \times \frac{1609 m}{1 mi} \times \frac{1 h}{3600 s} = 26.8 \frac{m}{s}$$

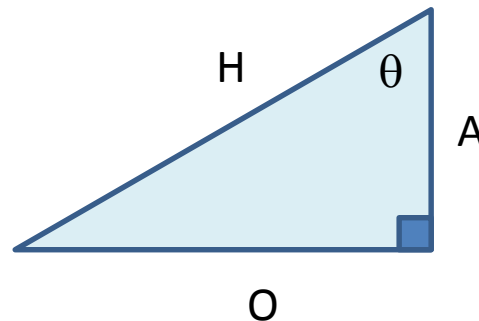
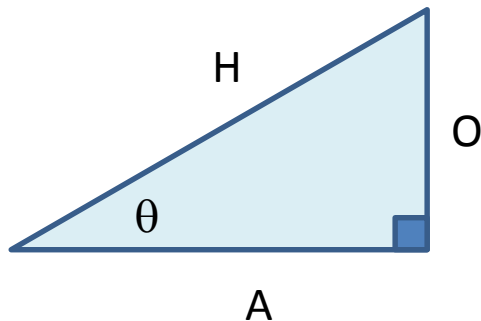
- **Note** $5000 m^2 = 5000 m \times m \times \frac{1 km}{1000 m} \times \frac{1 km}{1000 m} = 5 \times 10^{-3} km^2$

Trigonometry



- $\theta = S/R$
- Has no units! (units of S and R cancel)
- Is a ratio
- Call it radians to specify a circle.
- $2\pi = 360^\circ$

Right Angle Triangles



$$O^2 + A^2 = H^2$$

$$\sin\theta = \frac{O}{H}$$

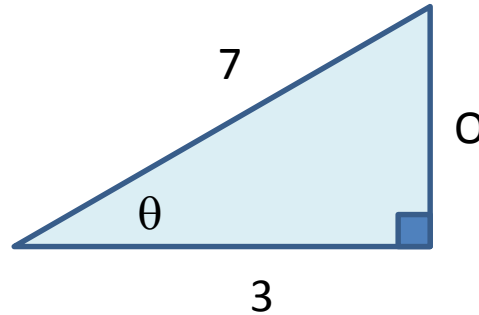
$$\cos\theta = \frac{A}{H}$$

$$\tan\theta = \frac{O}{A}$$

$$\theta = \sin^{-1}\left(\frac{O}{H}\right) \quad \theta = \cos^{-1}\left(\frac{A}{H}\right) \quad \theta = \tan^{-1}\left(\frac{O}{A}\right)$$

Calculator setting DRG determines if θ is in degrees or radians!

Example



- $0 = \sqrt{7^2 - 3^2} = 6.325$
- Have A and H, so use $\cos^{-1}$
- $\theta = \cos^{-1}(3/7) = 64.62^\circ = 1.128 \text{ rad}$