

7.2 cont. : Sector Area, Angular & Linear Speed

Sector Area (Area of part of a circle)




SA = Area of circle \times % circle

$$SA = \pi r^2 \cdot \frac{\theta}{360^\circ}$$

$$\text{SA}_{\text{radians}} = \pi r^2 \cdot \frac{\theta}{2\pi} = \frac{1}{2} \theta r^2$$

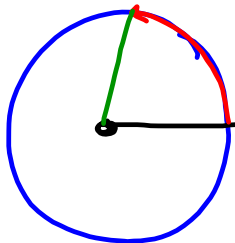
Angular & Linear Speed

Angular Speed = rate an object rotates



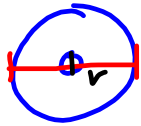
$$\omega = \frac{\theta}{t} \quad \frac{\text{angle rotated}}{\text{time}}$$

Linear Speed = rate an object moves along a circular path.



$$v = \frac{s}{t} \quad \frac{\text{arc length}}{\text{time}} \quad s = r\theta$$

A DVD



$$d = 120 \text{ mm}$$

$$r = 60 \text{ mm}$$

spins @ 3.5 rps

$$\theta = 3.5 \times 2\pi = 7\pi$$

$$\omega = 7\pi \text{ radians/sec}$$

$$\approx 22 \text{ rad/sec}$$

$$V = \frac{s}{t} = \frac{r \cdot \theta}{t} = \frac{60 \text{ mm} \cdot 7\pi \text{ radians}}{1 \text{ sec}}$$

$$420\pi \text{ radians/sec}$$

$$1319.5 \text{ radians/sec}$$