

Sample Problems

Hypothetical Situation

Radius (r) = 5m
Period (T) = 3 sec
Mass (m) = 10 Kg

Linear Speed

$$V = \frac{\text{distance}}{\text{time}} = \frac{\text{circumference}}{\text{time}} \quad \square \quad V = \frac{2 * \pi * r}{\text{time}}$$

$$V = \frac{2 * \pi * r}{3 \text{ sec}}$$

$$V = \frac{(10\text{m})\pi}{3 \text{ sec}}$$

$$V \approx \frac{31.4\text{m}}{3 \text{ sec}}$$

$$V \approx 10.46\text{m/s}$$

Angular Speed

$$\omega = \frac{2\pi}{T} = 2\pi f = \frac{v}{r}$$

$$\omega = \frac{2\pi}{3 \text{ sec}}$$

$$\omega = \frac{v}{r}$$

$$\omega = 2\pi f$$

$$\omega = 2.093 \text{ rad/s}$$

$$\omega = \frac{10.46 \text{ m/s}}{5 \text{ m}}$$

$$\omega = 2\pi(0.333 \text{ Hz})$$

$$\omega = 2.093 \text{ rad/s}$$

$$\omega = 2.093 \text{ rad/sec}$$

$$V = r\omega$$

$$V = (5\text{m})(2.093 \text{ rad/sec})$$

$$V = 10.46 \text{ m/sec}$$

Acceleration

$$\text{Acceleration} = \frac{v^2}{r} = \frac{(4\pi^2)r}{T^2}$$

$$A = \frac{v^2}{r}$$

$$A = \frac{(4\pi^2)r}{T^2}$$

$$A = \frac{(10.46 \text{ m/sec})^2}{5 \text{ m}}$$

$$A = \frac{(4\pi^2)(5 \text{ m})}{(3 \text{ sec})^2}$$

$$A = 21.88 \text{ m/sec}^2$$

$$A = 21.88 \text{ m/sec}^2$$

Work?

$$\text{Work} = (\text{Force})(\text{Displacement})[\cos(\theta)]$$

$$W = (ma)(\text{Displacement})[\cos(\theta)]$$

$$W = (218.8 \text{ N})(10 \text{ m})[\cos(90^\circ)]$$

$$W = (218.8 \text{ N})(10 \text{ m})(0)$$

$$W = 0 \text{ Joules}$$

