Linear and Angular Speed

Linear speed is calculated using: $\boldsymbol{v = \frac{s}{t}}$ (s is distance, t is time)

Angular speed is calculated using: $\boldsymbol{\omega = \frac{\theta}{t}}$ (θ is an angle in radians)

(Note: ω is read "omega", and it measures the *rate* at which an *angle* is changing.)

Ex 1.

Use $\omega = \frac{\theta}{t}$ to find the value of the missing variable.

$\theta = \frac{2\pi}{5}$ radians, $t = 10$ sec

What's the relationship between linear speed and angular speed if you're travelling along a circle?

$v = \frac{s}{t} = \frac{\theta r}{t} = \omega r$ So, $\boldsymbol{v = \omega r}$.

Ex 2.

Use $v = \omega r$ to find the value of the missing variable.

$v = 9$ m per sec, $r = 5$ m

Ex 3.

Find the angular speed ω of the second hand of a clock.

Ex 4.

Find the linear speed v of a point on the tread of a tire of radius 18 cm, rotating 35 times per min.

Practice

1. Find the linear speed v of the tip of the hour hand of a clock, if the hand is 8 cm long.

2. The tires of a bicycle have radius 12.0 in. and are turning at the rate of 150 revolutions per min. How fast is the bicycle traveling in miles per hour? (Note: 1 mile = 5280 feet.)

Q: What word starts with "e" and has only one letter in it?