

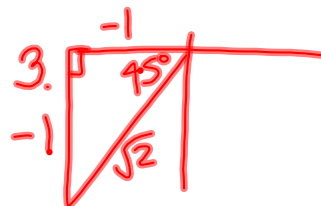
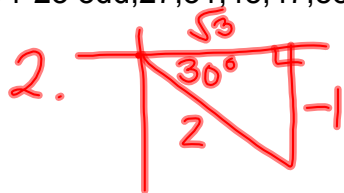
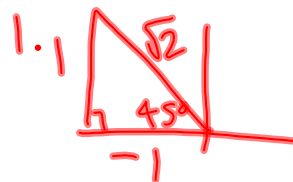
**Turn in Homework #2:**

Friday - 5.1#83-97 odd

Monday - 5.3 #29-37 odd, 39-70 all

Tuesday - 5.3 #79-82 all; 5.4 #1-23 odd, 27, 31, 45, 47, 53

Wednesday - 5.5 #7-24 all



Review:

Evaluate the following:

1.  $\sin 135^\circ = \frac{1}{\sqrt{2}}$

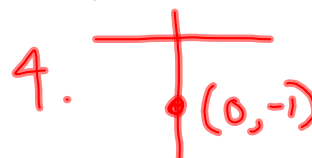
4.  $\cot(-450^\circ) = 0$

2.  $\tan \frac{11\pi}{6} = -\frac{1}{\sqrt{3}}$

5.  $\cos \frac{2\pi}{3} = -\frac{1}{2}$

3.  $\csc \frac{5\pi}{4} = -\sqrt{2}$

6.  $\cos 53\pi = -1$



Homework questions?

Linear Speed

$$v = \frac{s}{t}$$

Angular Speed

$$\omega = \frac{\theta}{t}$$

Arc Length

$$s = r\theta$$

Relating Linear & Angular Speed

$$V = r\omega$$

$r$  = radius or distance from the center of rotation  
(in, cm, km, etc.)

$s$  = arc length or linear distance along the circumference of a circle  
(in, cm, km, etc.)

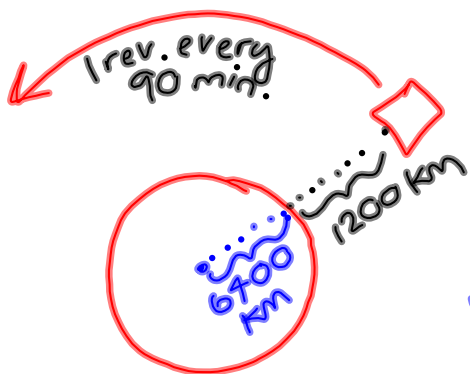
$\theta$  = angle or amount of rotation  
(deg, rad, revolutions, etc.)

$t$  = time  
(sec, min, hours, years, etc.)

$v = \frac{\text{linear distance}}{\text{time}} = \text{linear speed}$   
( $\frac{\text{km}}{\text{s}}, \frac{\text{mi}}{\text{h}}, \text{etc.}$ )

$\omega = \frac{\text{amount of rotation}}{\text{time}} = \text{angular speed}$   
( $\frac{\text{rev}}{\text{min}}, \frac{\text{deg}}{\text{s}}, \text{etc.}$ )

2. An earth satellite in circular orbit 1200 km high makes one complete revolution every 90 minutes. What is its linear speed in km/min, given that the earth's radius is 6400 km?



$$\omega = \frac{1 \text{ rev}}{90 \text{ min}}$$

$$r = 6400 + 1200 = 7600 \text{ km}$$

$$v = ? \text{ km/min}$$

$$v = r\omega$$

$$v = \frac{7600 \text{ km}}{1} \cdot \frac{1 \text{ rev}}{90 \text{ min}} \cdot \frac{2\pi}{1 \text{ rev}} = \frac{1520\pi}{9} \text{ km/min}$$

3. Through how many radians does the minute hand of a clock rotate from 12:45pm to 1:25pm?

$$\theta = ? \text{ rad} ; t = 40 \text{ min} ; \omega = \frac{1 \text{ rev}}{h}$$

$$t \cdot \omega = \frac{\theta}{\cancel{t}} \cdot \cancel{t}$$

$$\theta = \omega t = \frac{1 \text{ rev}}{h} \cdot \frac{40 \cancel{\text{min}}}{1} \cdot \frac{1 h}{60 \cancel{\text{min}}} \cdot \frac{2\pi}{1 \cancel{\text{rev}}}$$

$$= \boxed{\frac{4\pi}{3}}$$

4. A car travels at 60 miles per hour. Its wheels have a 24 inch diameter. What is the angular speed of a point on the rim of a wheel in revolutions per minute?

$$v = 60 \text{ mi/h} ; r = 12 \text{ in} ; \omega = ? \text{ rev/min}$$

$$\frac{v}{r} = \frac{\omega}{\cancel{r}} \quad \omega = \frac{v}{r} = \frac{v}{1} \cdot \frac{1}{r}$$

$$\omega = \frac{60 \cancel{\text{mi}}}{h} \cdot \frac{1}{12 \cancel{\text{in}}} \cdot \frac{1 h}{60 \cancel{\text{min}}} \cdot \frac{5280 \cancel{\text{ft}}}{1 \cancel{\text{mi}}} \cdot \frac{12 \cancel{\text{in}}}{1 \cancel{\text{ft}}} \cdot \frac{1 \cancel{\text{rev}}}{2\pi}$$

$$= \boxed{\frac{2640}{\pi} \text{ rev/min}}$$

Homework:

Five problems on handout and 5.4#61-79odd

\* correct answer for  
#79 is  $\sim 119$