

1. convert the following from degrees to radians
 $30^\circ = \frac{\pi}{6}$ radians

$$30^\circ \left(\frac{\pi}{180} \right) = \frac{\pi}{6} \text{ radians}$$

2. convert the following from radians to degrees

$$\frac{3\pi}{4} \text{ radians} = 135^\circ \text{ degrees}$$

$$\frac{3\pi}{4} \left(\frac{180}{\pi} \right) = 135^\circ$$

3. A bicycle has a tire of 26 inches in diameter that is rotating at 15 radians per second.
 Approximate the speed of the bicycle in miles per hour. (5280 feet in one mile)

$$\omega = \frac{15 \text{ rad}\cdot\text{ans}}{1 \text{ sec}}$$

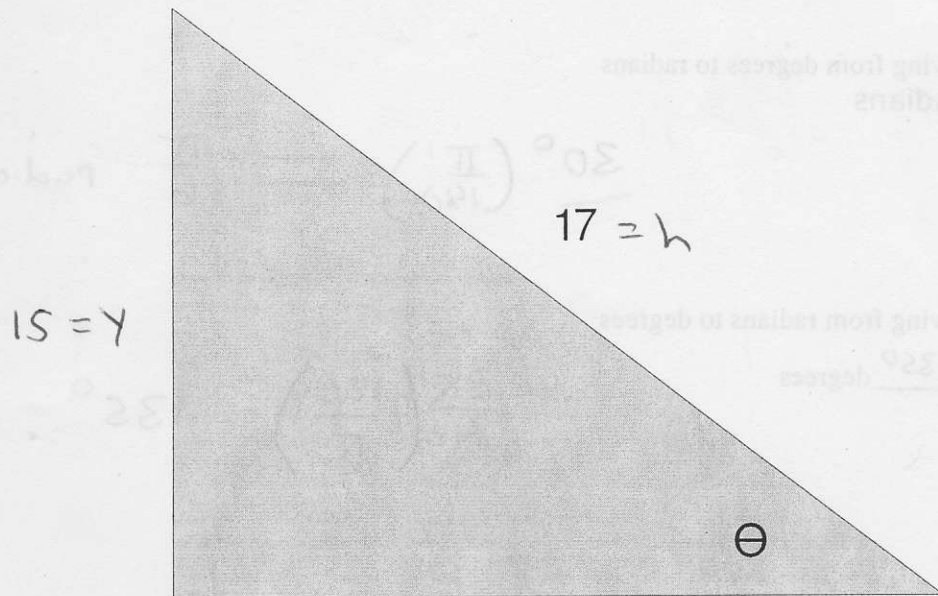
$$v = r\omega$$

$$= (13 \text{ in}) \left(\frac{15}{1 \text{ sec}} \right) = \frac{195 \text{ inches}}{\text{second}} \left(\frac{60 \text{ second}}{1 \text{ minute}} \right) \left(\frac{60 \text{ minutes}}{1 \text{ hour}} \right) \left(\frac{1 \text{ foot}}{12 \text{ inches}} \right) \left(\frac{1 \text{ mile}}{5280 \text{ ft}} \right)$$

$$= \frac{(195)(60)(60)}{(12)(5280)} \frac{\text{miles}}{\text{hour}}$$

$$= 11.08 \frac{\text{miles}}{\text{hour}}$$

4. Find the six trigonometric functions of θ



$$Y^2 + 8^2 = 17^2$$

$$Y^2 = 17^2 - 8^2$$

$$Y = \sqrt{17^2 - 8^2}$$

$$Y = 15$$

$$\sin \theta = \frac{Y}{h} = \frac{15}{17}$$

$$\cos \theta = \frac{X}{h} = \frac{8}{17}$$

$$\tan \theta = \frac{Y}{X} = \frac{15}{8}$$

$$\csc \theta = \frac{h}{Y} = \frac{17}{15}$$

$$\sec \theta = \frac{h}{X} = \frac{17}{8}$$

$$\cot \theta = \frac{X}{Y} = \frac{8}{15}$$