

Angular and Linear Speed Practice

1. A boy rotates a stone in a 3-foot long sling at the rate of 15 revolutions every 10 seconds.

a) Find the angular velocity of the stone in radians per second.

$$3\pi \text{ rad/sec}$$

b) Find the linear velocity of the stone in feet per second.

$$9\pi \text{ ft/sec}$$

2. A cylinder with a 2.5 ft radius is rotating at 120 rpm.

(a) Give the angular velocity in rad/sec.

$$4\pi \text{ rad/sec}$$

(b) Find the linear velocity of a point on its rim in mph.

$$\frac{75\pi}{11} \text{ mph}$$

3. A cylinder with a 2 ft radius is spinning at 450 rpm.

(a) Find its angular velocity in radians per sec.

$$15\pi \text{ rad/sec}$$

(b) Find the linear speed on the rim in mph.

~~$$30\pi \text{ mph}$$~~

$$\frac{205\pi}{11}$$

4. A woman is riding a bicycle whose wheels are 26 inches in diameter. The wheels rotate at 125 revolutions per minute (rpm).

a) Find the angular speed in radians per minute.

$$250\pi \text{ rad/min}$$

b) Find the speed she is traveling (aka linear speed) in inches per minute.

$$3250\pi \text{ in/min}$$

c) Find the speed she is traveling (aka linear speed) in miles per hour.

Recall: 12 inches = 1 foot and 5280 feet = 1 mile

$$\frac{1625\pi \text{ mi/hr}}{5280}$$

5. Suppose that a machine contains a wheel of diameter 3 feet, rotating at a rate of 1600 rpm.

a) Find the angular speed of the wheel in radians per minute.

$$3200\pi \text{ rad/min}$$

b) Find the linear speed of a point on the circumference of the wheel in feet per minutes then also in miles per hour.

$$4800\pi \text{ ft/min}$$

$$\frac{600\pi \text{ mph}}{11}$$

6. A tire with a 9 inch radius is rotating at 30 rpm. Find the angular velocity of a point on its rim. Also express the result in revolutions per minute.

$$211200 \text{ rad/hr} = \frac{1760}{11} \text{ rev/min}$$