

Name: AK
 Date: _____ Period: _____

6.1 Practice Problems

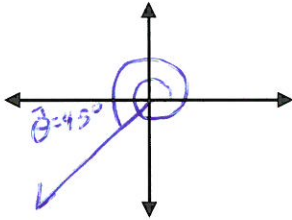
Please write neatly in the space provided, showing all work. If the problem calls for an exact value, you may **not** use your calculator to evaluate the trig function.

1. For the angle, 585°

- Draw the angle in standard position.
- Convert to radian measure using exact values.
- Name the reference angle in both degrees and radians.

$$\frac{585 \cdot \pi}{180} = \frac{13\pi}{4}$$

$$\hat{\theta} = 45^\circ, \hat{\theta} = \frac{\pi}{4}$$

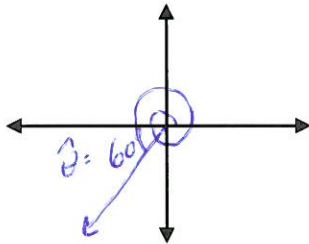


2. For the angle $\frac{10\pi}{3}$,

- Convert to degree measure.
- Draw the angle in standard position.
- Name the reference angle in both degrees and radians.

$$10\left(\frac{\pi}{3}\right) = 10 \cdot 60 = 600^\circ$$

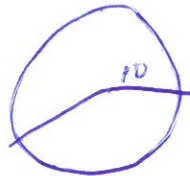
$$\hat{\theta} = 60 = \frac{\pi}{3}$$



3. If the minute hand of the clock is 10 inches long. What is the distance that the tip of the minute hand moves from 6:15 to 6:40?

$$\frac{25}{60} = \frac{x}{2\pi}$$

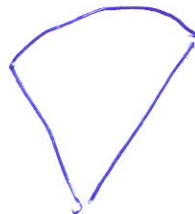
$$\frac{5\pi}{6} = x$$



$$s = r \cdot \theta$$

$$s = 10 \left(\frac{5\pi}{6}\right) = \frac{50\pi}{6} \approx 26.16$$

4. A windshield wiper is 18 inches long, and rotates 75° . If the blade covers the entire wiper what is the area that the blade can clear off?



$$\frac{75}{360} \cdot \pi r^2$$

$$\frac{75}{360} \pi (18) = 11.775 \text{ in}^2$$

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.

b) Find the linear speed of a point on the circumference of the wheel.

$$a) 1600 \cdot \frac{2\pi}{1 \text{ min}} = 3200\pi \text{ rads/min}$$

$$b) 1600 \cdot 2\pi(1.5) = 4800\pi \text{ ft/min}$$

$$\approx 15072 \text{ ft/min}$$

6. A typical tire for a compact car is 22 inches in diameter. If the car is traveling at a speed of 60 mph, find the number of revolutions the tire makes per minute.

$$\frac{60 \text{ miles}}{\text{hour}} \cdot \frac{1 \text{ hour}}{60 \text{ min}} \cdot \frac{5280 \text{ ft}}{1 \text{ mile}} \cdot \frac{12 \text{ in}}{1 \text{ ft}} = 63360 \frac{\text{in}}{\text{min}}$$

$$1 \text{ rev} = 22\pi$$

$$\frac{63360}{22\pi} \frac{\text{rev}}{\text{min}} \approx 917.2$$

7. Earth revolves on its axis once every 24 hours. Assuming that Earth's radius is 6400 km, find the following:

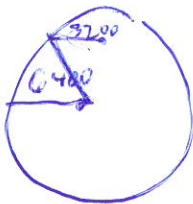
a) angular speed of Earth in radians per day and radians per hour. $\frac{2\pi}{24} = \frac{\pi}{12} \text{ rads/hr}$

b) linear speed at the North or South Pole. 0

c) linear speed at Quito, Ecuador, a city on the equator. $\frac{12800\pi}{24} \frac{\text{km}}{\text{hr}} = 1674.66 \frac{\text{km}}{\text{hr}}$

d) linear speed at Salem, Oregon (halfway from the equator to the North Pole)

c)



$$\frac{6400\pi}{24} = 837.33 \frac{\text{km}}{\text{hr}}$$