Secondary Math 2 Honors   Name_____

9.4 Radians, Arc Length, and Sector Area   Date_____   Period____

1) What is a radian?

2) Explain where the formula for circumference ($2\pi r$) comes from.

Convert each degree measure into radians.

3) 130°

4) -210°

5) 220°

6) -50°

Convert each radian measure into degrees.

7) $\dfrac{\pi}{3}$

8) $-\dfrac{3\pi}{4}$

9) $\dfrac{2\pi}{3}$

10) $\dfrac{5\pi}{3}$

Find the exact value of each trigonometric function.

11) $\tan -\dfrac{\pi}{4}$

12) $\tan -\dfrac{5\pi}{4}$

13) $\tan \dfrac{4\pi}{3}$

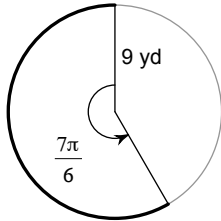14) $\cos \dfrac{\pi}{2}$

15) $\tan -\dfrac{4\pi}{3}$

16) $\sin -\dfrac{5\pi}{6}$
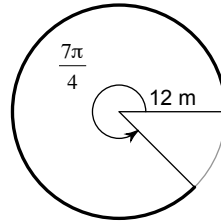
17) Explain where the formulas for arc length and sector area come from.
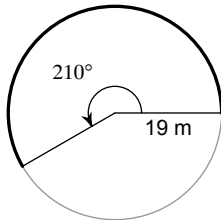
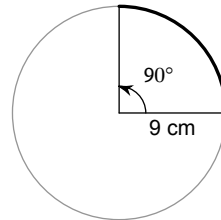**Find the exact length of each arc.**

18)
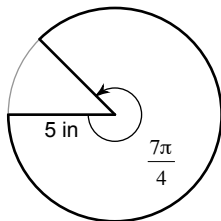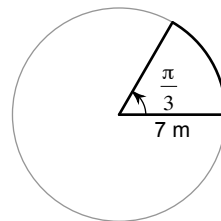
9 yd

$\dfrac{7\pi}{6}$

19)

$\dfrac{7\pi}{4}$

12 m

20)

210°

19 m

21)

90°

9 cm

Find the exact area of each sector.

22)

5 in

$\dfrac{7\pi}{4}$

23)

$\dfrac{\pi}{3}$

7 m

24)

10 cm

90°

25)

5 km
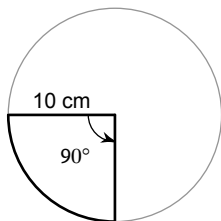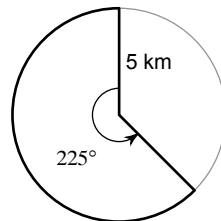
225°

26) Suppose a windshield wiper has a length of 22 in. and rotates through an angle of 110°. What distance does the tip of the wiper travel as it moves once across the windshield?

27) A geostationary satellite is positioned 35,800 km above Earth's surface. It takes 24 hours to complete one orbit. The radius of Earth is about 6400km.

a. Draw a picture of the situation.

b. What distance does the satellite travel in 1 hr? 3 hr? 2.5 hr? 25 hr?

c. After how many hours has the satellite traveled 200,000 km?