$S = \theta r$

$S = $ arc length
$\theta = $ central angle (in radians)
$r = $ radius

Name **Schlansky**

Date _____
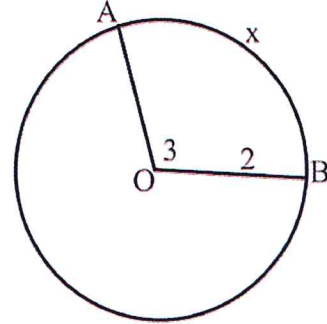
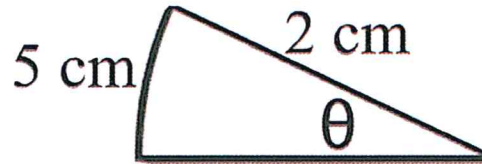Mr. Schlansky

Geometry

Arc Length

1. In circle O, the measure of central angle AOB is 3 radians and the length of $\overline{OB}$ is 2 cm. What is the measure of arc AB?

$S = \theta r$

$x = 3(2)$

$x = 6$

2. What is the measure of the central angle below?

$S = \theta r$

$\dfrac{S}{2} = \dfrac{x(2)}{2}$

$\dfrac{5}{2} = x$

5 cm   2 cm θ

3. What is the measure of the radius of a sector whose arc length is 12 inches and has a central angle of 4 radians?

$S = \theta r$

$\dfrac{12}{4} = \dfrac{4r}{4}$

$3 = r$

4. A wheel has a radius of 18 inches. Which distance, to the *nearest inch*, does the wheel travel when it rotates through an angle of $\dfrac{2\pi}{5}$ radians?

arc length

$S = \theta r$

$S = \dfrac{2\pi}{5}(18)$

$S = 23$

5. What is the measure of a central angle in ~~degrees~~ *radians* whose arc length is 6 meters and whose radius measures 8 meters?

$$S = \theta r$$
$$\frac{6}{8} = \frac{x(8)}{8}$$
$$\frac{3}{4} = x$$

6. In the diagram below, the circle shown has radius 10. Angle B intercepts an arc with a length of 2π.
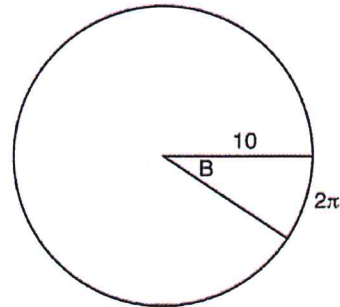
What is the measure of angle B, in radians?

1) $10 + 2\pi$
2) 20π
3) $\dfrac{\pi}{5}$ ← (circled)
4) $\dfrac{5}{\pi}$

$$S = \theta r$$
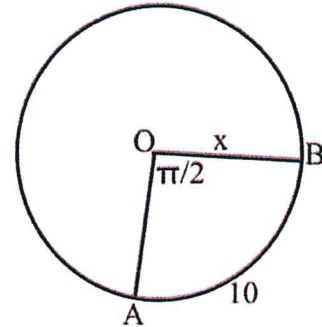$$\frac{2\pi}{10} = \frac{B(10)}{10}$$
$$\frac{\pi}{5} = B$$

7. In circle O, the measure of central angle AOB is $\dfrac{\pi}{2}$ radians and the length of arc AB is 10 cm. What is the measure of radius $\overline{OB}$ to the *nearest tenth of a cm*?

$$S = \theta r$$
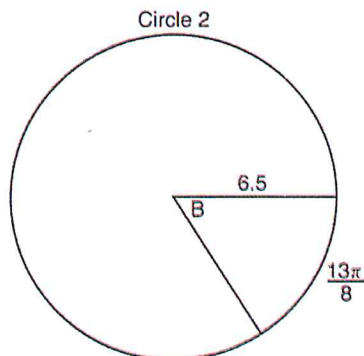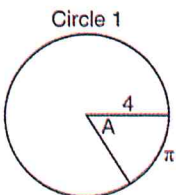$$2(10) = \frac{\pi}{2}(x)2$$
$$20 = \pi x$$
$$x = 6.4$$

8. In the diagram below, Circle 1 has radius 4, while Circle 2 has radius 6.5. Angle A intercepts an arc of length π, and angle B intercepts an arc of length $\dfrac{13\pi}{8}$.

Dominic thinks that angles A and B have the same radian measure. State whether Dominic is correct or not. Explain why.

Yes, they're both $\frac{\pi}{4}$

Circle 1

Circle 2

$$S = \theta r$$
$$\frac{\pi}{4} = \frac{\theta(4)}{4}$$
$$\frac{\pi}{4} = \theta$$

$$S = \theta r$$
$$\frac{\frac{13\pi}{8}}{6.5} = \frac{\theta(6.5)}{6.5}$$

$$\frac{13\pi}{8} = \frac{6.5\theta}{6.5}$$
$$\frac{\pi}{4} = \theta$$