

Complete each problem. Show work for each answer.

1. Convert the degree measures into radians. Leave answers as exact values in most reduced form.

a)  $140^\circ$

$$140\left(\frac{\pi}{180}\right)$$

$$\underline{\frac{7\pi}{9}} \text{ radians}$$

b)  $300^\circ$

$$300\left(\frac{\pi}{180}\right)$$

$$\underline{\frac{5\pi}{3}} \text{ radians}$$

2. Convert the following radian measures into degrees.

a)  $\frac{23\pi}{12} \left(\frac{180}{\pi}\right)$

$$\underline{345^\circ}$$

b)  $\frac{7\pi}{2} \left(\frac{180}{\pi}\right)$

$$\underline{630^\circ}$$

3. Determine the arc length.

a) Central Angle of  $\frac{10\pi}{9}$  rad,  
radius of 18 cm.

$$S = \Theta r = \left(\frac{10\pi}{9}\right)\left(\frac{18}{1}\right)$$

$$s = \underline{20\pi \text{ cm}} \text{ (E)}$$

b) Central Angle of  $80^\circ$ ,  
radius of 6 cm.

$$S = \left(\frac{x}{360}\right)2\pi r$$

$$S = \left(\frac{80}{360}\right)2\pi(6)$$

$$s = \underline{\frac{8\pi}{3} \text{ cm}} \text{ (E)}$$

4. Determine the missing information.

a)  $r = 5 \text{ cm}$ ,  $\Theta = \frac{9\pi}{5}$  rad.

$$S = \Theta r = \left(\frac{9\pi}{5}\right)\left(\frac{5}{1}\right)$$

$$s = \underline{9\pi} \text{ cm}$$

b)  $\Theta = \frac{4\pi}{5}$  rad.,  $s = \frac{3\pi}{5}$  cm

$$S = \Theta r$$

$$\left(\frac{4\pi}{5}\right)\left(\frac{3\pi}{5}\right) = \left(\frac{4\pi}{5}\right)r(5)$$

$$\frac{3\pi}{4\pi} = \frac{4\pi r}{4\pi}$$

$$r = \underline{\frac{3}{4} \text{ or } 0.75} \text{ cm}$$

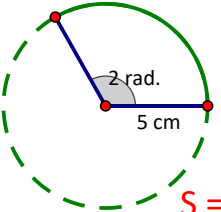
5. Find the central angle (in rad) that intercepts an arc of length  $\frac{\pi}{6}$  cm in a circle of radius 10 cm.

$$S = \Theta r$$

$$\frac{\pi}{6} = \Theta(10)$$

$$\Theta = \frac{\pi}{60} \text{ rad}$$

7. Determine the arc length of the following.

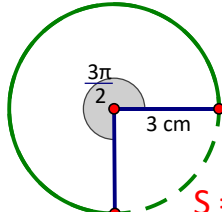
a) 

$$S = \Theta r$$

$$S = 2(5)$$

$$S = 10$$

s = 10 cm (E)

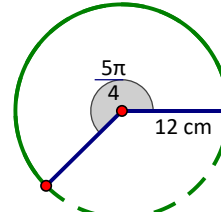
b) 

$$S = \Theta r$$

$$S = \frac{3\pi}{2}(3)$$

$$S = \frac{9\pi}{2}$$

s =  $\frac{9\pi}{2}$  cm (E)

c) 

$$S = \Theta r$$

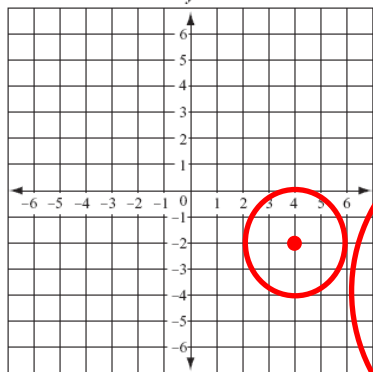
$$S = \frac{5\pi}{4}(12)$$

$$S = 15\pi$$

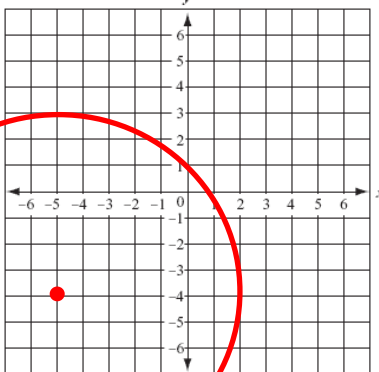
s = 15π cm (E)

8. Graph each circle.

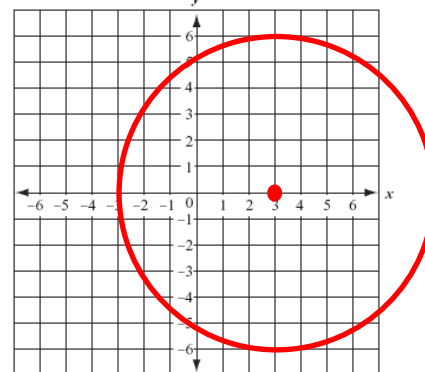
a)  $(x - 4)^2 + (y + 2)^2 = 4$   
Center: (4, -2), radius: 2



b)  $(x + 5)^2 + (y + 4)^2 = 49$   
Center: (-5, -4), radius: 7



c)  $(x - 3)^2 + y^2 = 36$   
Center: (3, 0), radius: 6



9. Write the equation of a circle with the given characteristics.

a) Diameter Endpoints: (1, 1) and (5, 5)

Center:  $(\frac{1+5}{2}, \frac{1+5}{2}) = (3, 3)$

Radius:  $\sqrt{2^2 + 2^2} = \sqrt{8}$

$$(x - 3)^2 + (y - 3)^2 = 8$$

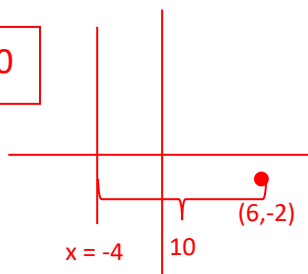
b) Center: (9, 7) Passes Through: (-6, -2)

Radius:  $\sqrt{(9 + 6)^2 + (7 + 2)^2} = \sqrt{225 + 81} = \sqrt{306}$

$$(x - 9)^2 + (y - 7)^2 = 306$$

c) Center: (6, -2) Tangent to  $x = -4$

$$(x - 6)^2 + (y + 2)^2 = 100$$



d) Center: (-3, -8) with an area of  $121\pi \text{ cm}^2$

$$A = \pi r^2$$

$$121\pi = \pi r^2$$

$$r^2 = 121$$

$$(x + 3)^2 + (y + 8)^2 = 121$$