Lesson 6

READY, SET, GO! Name Period Date

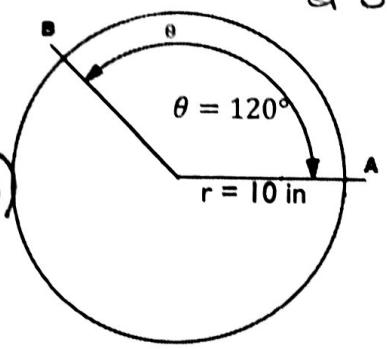
READY
Topic: Finding the length of an arc using proportions

Use the given degree measure of the central angle to set up a proportion to find the length of arc AB.

Leave π in your answers. Recall $s = \frac{\theta}{360^\circ}(d\pi)$ *where s is the arc length.*

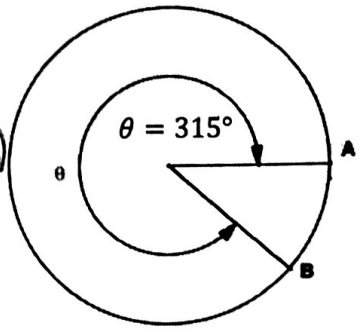
or $S = \frac{\theta}{360^\circ} \cdot 2\pi r$

1.



$S = \frac{120}{360} \cdot 2\pi(10)$
$= \frac{20\pi}{3}$ in

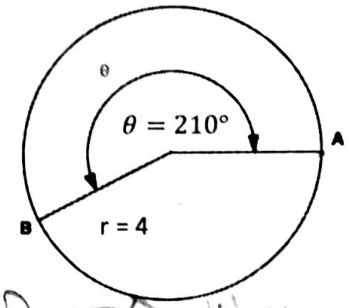
2.



r = 16 cm

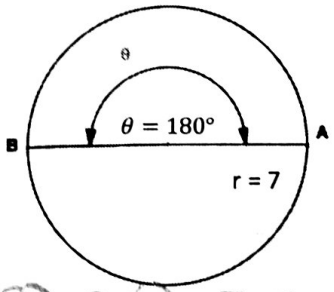
$S = \frac{315}{360} \cdot 2\pi(16)$
$= 28\pi$ cm

3.



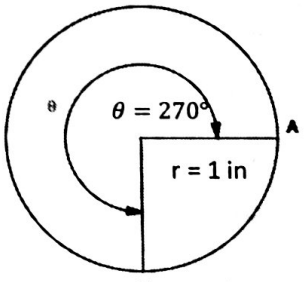
$S = \frac{210}{360} \cdot 2\pi(4) = \frac{14}{3}\pi$

4.



$S = \frac{180}{360} \cdot 2\pi(7) = 7\pi$

5.



$S = \frac{270}{360} \cdot 2\pi(1) = \frac{3\pi}{2}$ in

6. The circumference of circle A is 400 meters. The circumference of circle B is 800 meters. What is the relationship between the radius of circle A and the radius of circle B?

Justify your answer.

Circle A: $C = 2\pi r$
$400 = 2\pi r$
$\frac{400}{(2\pi)} = r$
$63.66 = r$

Circle B: $C = 2\pi r$
$800 = 2\pi r$
$\frac{800}{(2\pi)} = r$
$127.32 = r$

The radius of Circle A is half the length of the radius of Circle B.

GO

Topic: Converting angles between radians and degrees

Recall that there are 360 **degrees** in a full circle and 2π **radians** in a full circle. Therefore, $360º = 2\pi$ radians. If we divide both sides of the equation by 2, we create another identity $180º = 1\pi$ *radians*. We can use this identity to convert degrees to radians or radians to degrees.

Since $180° = \pi$ *radians*, it follows that $\frac{\pi \text{ radians}}{180°} = \frac{180°}{\pi \text{ radians}} = 1$.

If I want to convert 72º into radian measure, then I need the unit of degrees to cancel, so I will multiply 72º by $\frac{\pi \text{ radians}}{180°}$, example: $72° \cdot \frac{\pi \text{ radians}}{180°} = \frac{72º \times \pi \text{ radians}}{180º} = \frac{2\pi \text{ radians}}{5}$.

The unit *radians* is usually left off. Hence, an angle that measures 72º is equivalent to a radian measure of $\frac{2\pi}{5}$.

Convert the following angles from degrees to radians or radians to degrees.

14. 45°

$45° \cdot \frac{\pi}{180°} = \frac{\pi}{4}$

15. 15°

$15° \cdot \frac{\pi}{180°} = \frac{\pi}{12}$

16. 54°

$54° \cdot \frac{\pi}{180°} = \frac{3\pi}{10}$

17. 135°

$135° \cdot \frac{\pi}{180°} = \frac{3\pi}{4}$

18. 300°

$300° \cdot \frac{\pi}{180°} = \frac{5\pi}{3}$

19. 270°

$270° \cdot \frac{\pi}{180°} = \frac{3\pi}{2}$

20. $\frac{5\pi}{6}$

$\frac{5\pi}{6} \cdot \frac{180°}{\pi} = 150°$

21. $\frac{\pi}{8}$

$\frac{\pi}{8} \cdot \frac{180°}{\pi} = 22.5°$

22. $\frac{3\pi}{4}$

$\frac{3\pi}{4} \cdot \frac{180°}{\pi} = 135°$

23. $\frac{7\pi}{5}$

$\frac{7\pi}{5} \cdot \frac{180°}{\pi} = 252°$

24. $\frac{\pi}{18}$

$\frac{\pi}{18} \cdot \frac{180°}{\pi} = 10°$

25. $\frac{13\pi}{12}$

$\frac{13\pi}{12} \cdot \frac{180°}{\pi} = 195°$