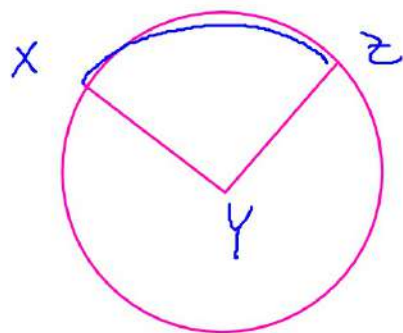Central Angle

$$m\angle XYZ = m\overset{\frown}{XZ}$$

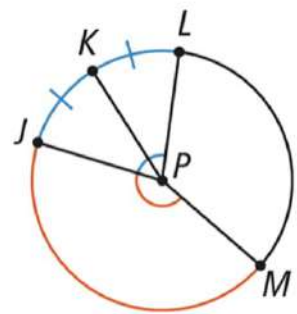Intercepted Arc

Arc Measure

The measure of an arc is equal to the measure of its corresponding central angle.

$$m\overset{\frown}{JM} = m\angle JPM$$

Congruent central angles intercept congruent arcs, and congruent arcs are intercepted by congruent central angles.
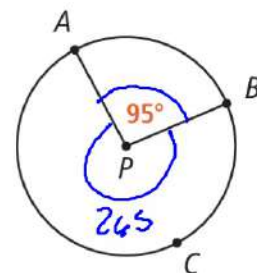
$$\angle JPK \cong \angle KPL \qquad \overset{\frown}{JK} \cong \overset{\frown}{KL}$$

What are $m\overset{\frown}{AB}$ and $m\overset{\frown}{ACB}$?

SOLUTION

$$m\overset{\frown}{AB} = 95°$$

$$m\overset{\frown}{ACB} = 265$$

A
95°
P
B
265
C

$$360 - 95$$
$$= 265$$

1. Use ⊙*W*.

a. What is *mX̂Z*? =115

> Enter your answer.
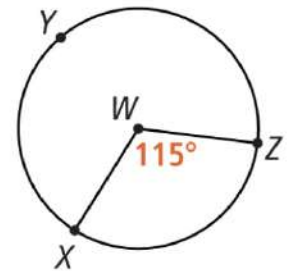
b. What is *mX̂YZ*? 245

A. How do you find the length *s* of an arc measured in degrees?

The *measure* of an arc is a fraction of 360.

The **arc length** is a fraction of the circumference.
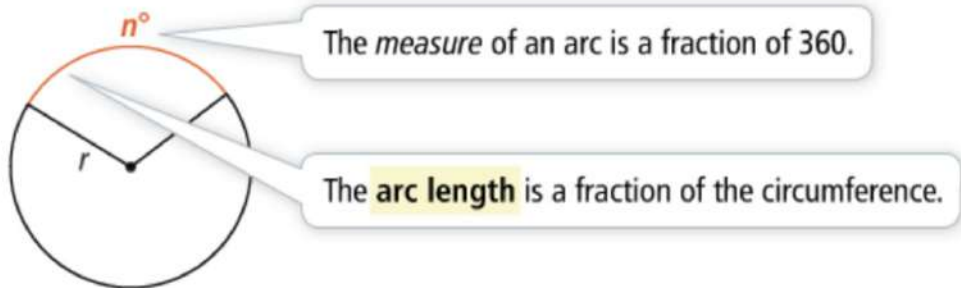
Use a proportion to represent the relationship between arc length *s*, radius *r*, and arc measure *n*.

$$\frac{\text{arc length}}{\text{circumference}} = \frac{\text{arc measure}}{360}$$

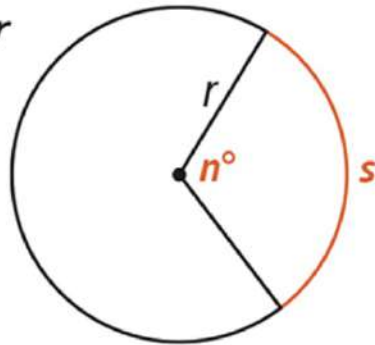$$\frac{s}{2\pi r} = \frac{n}{360}$$

$$s = \frac{n}{360} \cdot 2\pi r$$

The formula to find the length of an arc is $s = \dfrac{n}{360} \cdot 2\pi r$.
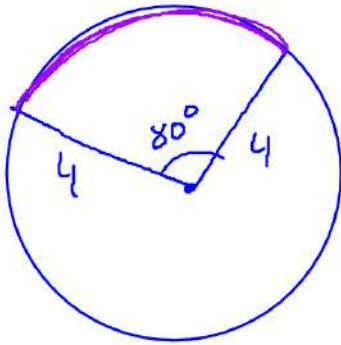
Arc Length

The length s of an arc of a cirlce is the product of the ratio relating the measure of the central angle in degrees to 360 and the circumference of the circle.

Central angle in degrees:

$$s = \frac{n}{360} \cdot 2\pi r$$

2. a. In a circle with radius 4, what is the length of an arc that has a measure of 80? Round to the nearest tenth.
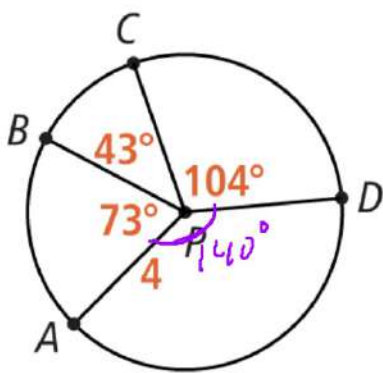
$$S = \frac{n}{360} \cdot 2\pi r$$

$$\frac{80}{360} \cdot 2\pi(4)$$

$$\frac{2}{9}(8\pi)$$

$$\frac{16\pi}{9} = 1.8\pi$$

What is the length of $\overset{\frown}{AD}$? Express the answer in terms of π.

C
B
43°
104°
73°
140°
4
D
A

r = 4

$S = \dfrac{n}{360} \cdot 2\pi r$

$= \dfrac{140}{360} = 2\pi(4)$

$= \dfrac{7}{18}(8\pi)$

$\dfrac{56\pi}{18} = \dfrac{28\pi}{9}$