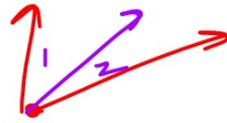Geometry 10.2
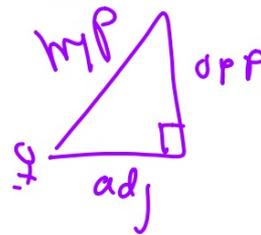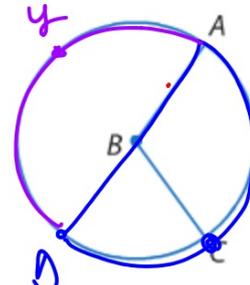Identify circle angles and arcs
Find measures of arcs and angles

central angle vertex at center
arc   ship based on ↑
minor arc   < $\frac{1}{2}$
major arc   > $\frac{1}{2}$ $\overarc{AC}$
semicircle $= \frac{1}{2}$ $\overarc{AXC}$
adjacent   2
   ↓ next to $\overarc{ACD}$ $\overarc{AyD}$

hyp   opp
leg   adj
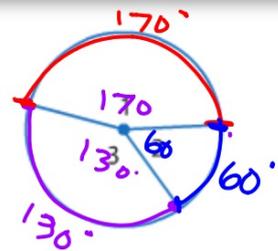
Degrees in one full circle: $360 \approx$ arcs
angles

KeyConcept Sum of Central Angles

Words	The sum of the measures of the central angles of a circle with no interior points in common is 360.
Example	$m\angle 1 + m\angle 2 + m\angle 3 = 360$

360
-240
$\overline{120}$

360
-300
$\overline{60}$

170°
170
60
130.
130°
60°

Measure of central angle (degrees) = measure of its arc (degrees)

1A.

$\overset{\frown}{DB}$

1B. C
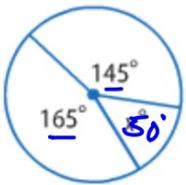
$$\begin{array}{r} 360 \\ -310 \\ \hline 50 \end{array}$$

145°
165° 50°

85°
40° ∠ 145°

D

E
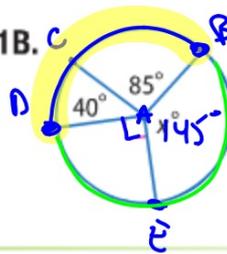
$$\begin{array}{r} 360 \\ -215 \\ \hline 145° \end{array}$$

$\overset{\frown}{DEB}$

130°

arc

130°

O

23°

P

R

arc

X
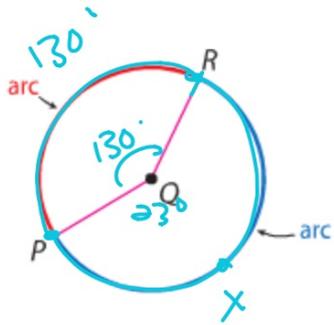
$\overset{\frown}{P\,x\,R} = 230°$

Arc MEASURE vs Arc LENGTH

degrees

$r =$
$d =$

cm

in

ft

$\left(\dfrac{90}{360}\right) \text{Circumf.}$

Arc	Measure
A **minor arc** is the shortest arc connecting two endpoints on a circle.	The measure of a minor arc is less than 180 and equal to the measure of its related central angle. $m\overset{\frown}{AB} = m\angle ACB = x$
A **major arc** is the longest arc connecting two endpoints on a circle.	The measure of a major arc is greater than 180, and equal to 360 minus the measure of the minor arc with the same endpoints. $m\overset{\frown}{ADB} = 360 - m\overset{\frown}{AB} = 360 - x$
A **semicircle** is an arc with endpoints that lie on a diameter.	The measure of a semicircle is 180. $m\overset{\frown}{ADB} = 180$
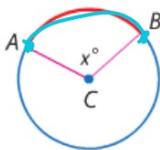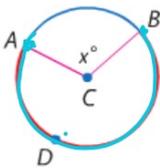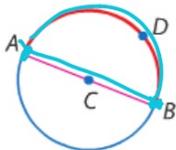
Self-Check Practice

p707

$\overset{\frown}{AB}$

two letters

$\overset{\frown}{ADB}$

needs 3 letters

$\overset{\frown}{ADB}$

needs 3 letters

full ⊙ = 100%.
= 360°

Female Participation in Sports

A

F

Other
14%

Basketball
20%

B

Soccer
14%

S

Track &
Field
18%

E

Softball
16%

Volleyball
18%

C

D
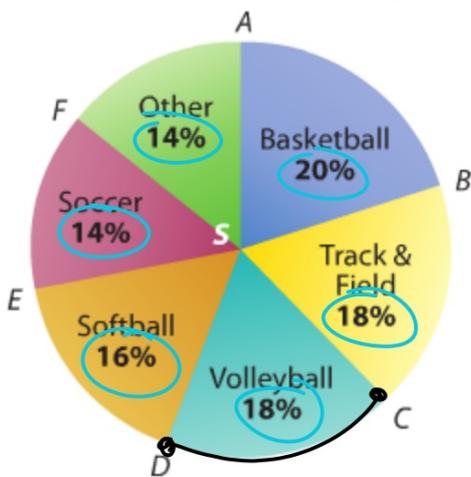
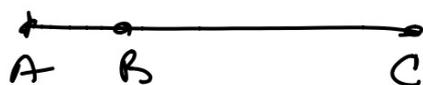**SPORTS** Refer to the circle graph. Find each measure.

a. $m\widehat{CD}$

$$(360)(.18) = 64.8°$$

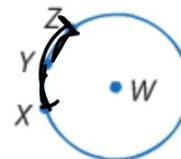Remember segment addition?   Angle addition?

$$AB + BC = AC$$

A ────●────────────────●────
A   B   C
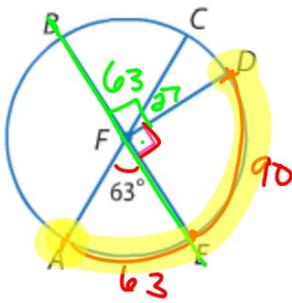
$$m\overgroup{ZY} + m\overgroup{YX} = m\overgroup{ZX}$$

Postulate 10.1 Arc Addition Postulate

Words	The measure of an arc formed by two adjacent arcs is the sum of the measures of the two arcs.
Example	$m\overgroup{XYZ} = m\overgroup{XY} + m\overgroup{YZ}$

Example 4 Use Arc Addition to Find Measures of Arcs

Find each measure in ⊙F.

a. $m\widehat{AED}$ 153°

$\widehat{AD}$

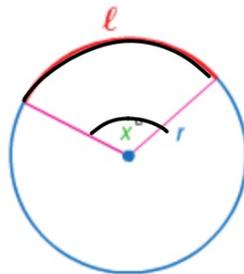Hint: arc = central angle

notice: radius of circle is not given...

KeyConcept Arc Length

Words
The ratio of the **length of an arc ℓ** to the **circumference** of the circle is equal to the ratio of the **degree measure of the arc** to 360.

Proportion
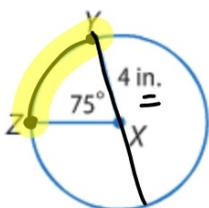$$\frac{\ell}{2\pi r} = \frac{x}{360} \text{ or}$$

1. What is Circumference?
2. What fraction of the circle is it?

What fraction of the circle is it?

Example 5 Find Arc Length

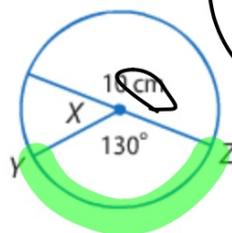**Find the length of $\overarc{ZY}$. Round to the nearest hundredth.**

a.

$Zy = \left(\dfrac{75}{360}\right)\left(25.133\right)$

$= 5.24\,in$

75° 4 in.

$C = \pi \cdot 8$
$= 25.133$

b.

10 cm
130°

$\left(\dfrac{130}{360}\right)\left(31.416\right)$

$11.34\,cm$

$C = \pi \cdot 10$
$= 31.416$

112°
9
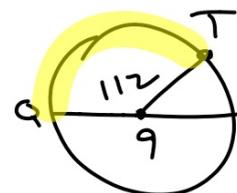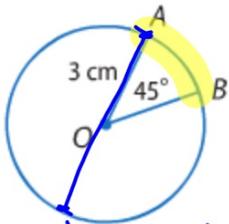
How do you know whether to answer in degrees (central angle) or inches (part of circumference)?

"find the measure"   "find the length"

$\left(\dfrac{112}{360}\right)\left(9\pi\right)$

$8.80\,cm$

Find the length of $\widehat{AB}$. Round to the nearest hundredth.

$$\frac{120}{360}\left(\pi \cdot 16\right)$$

5A.

3 cm, 45°, A, B, O

$$\left(\frac{45}{360}\right)\left(6\pi\right)$$

5B.

14 m, 80°, A, O, B

$$\frac{80}{360}\left(\pi \cdot 14\right)$$

5C.

A, O, 120°, 8 ft, B

10, 2   p. 710
    13-49 問題