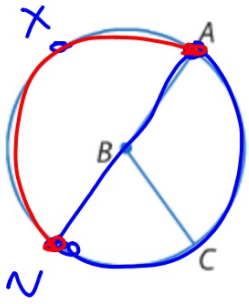
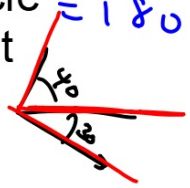
Geometry 10.2
Identify circle angles and arcs
Find measures of arcs and angles



central angle vertex @ center
arc 2 radii
minor arc $< 180°$ $\overset{\frown}{AC}$
major arc $> 180°$ $\overset{\frown}{AXC}$
semicircle $= 180$ $\overset{\frown}{ACN}$
adjacent $\overset{\frown}{AXN}$



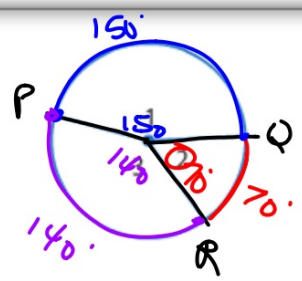
Degrees in one full circle:

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 $m\angle 1 + m\angle 2 + m\angle 3 = 360$

$150 + 70 + ? = 360$

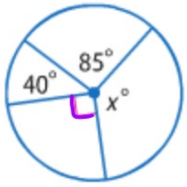


Measure of central angle (degrees) = measure of its arc (degrees)

GuidedPractice

1A.

1B.



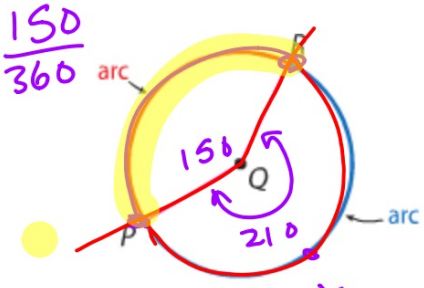
$x° + 165 + 145 = 360$

$50°$

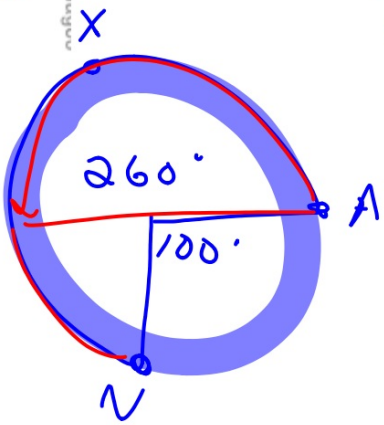
$40 + 85 + 90 + x = 360$

$x = 145°$

$\frac{150}{360}$



$\frac{210}{360}$



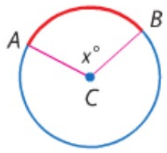
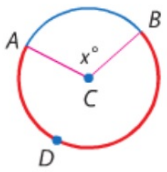
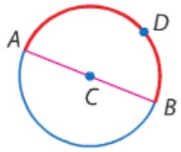
$360 - 100$

Arc MEASURE vs Arc LENGTH

(angle) degrees

(circumf.) (units)

KeyConcept Arcs and Arc Measure

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. $m\overset{\frown}{ADB} = 180$	

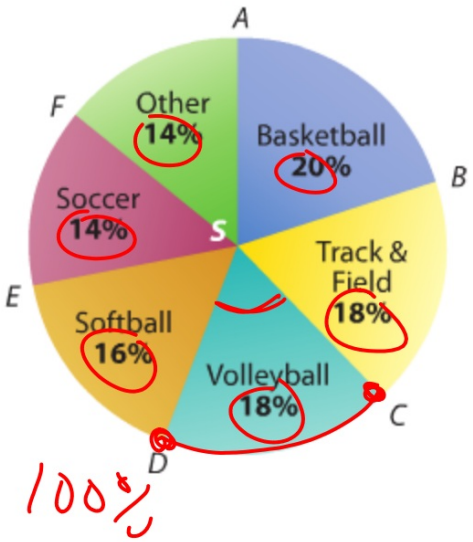
Self-Check Practice

two letters

needs 3 letters

needs 3 letters

Female Participation in Sports



100%

Real-World Example 3 Find Arc Measures in

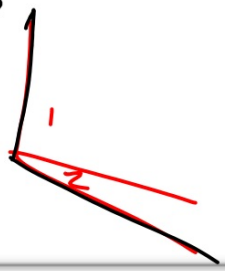
SPORTS Refer to the circle graph. Find each measure.

a. $m\overset{\frown}{CD}$ = 64.8°

.18(360)

Remember segment addition? Angle addition?

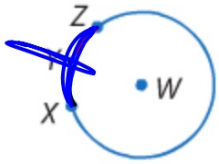
$AB + BC = AC$



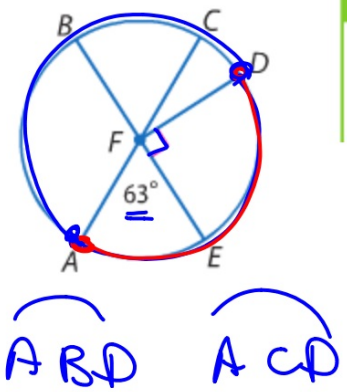
Postulate 10.1 Arc Addition Postulate

Words The measure of an arc formed by two adjacent arcs is the sum of the measures of the two arcs.

Example $m\overset{\frown}{XYZ} = m\overset{\frown}{XY} + m\overset{\frown}{YZ}$



$\overset{\frown}{XZ}$



Example 4 Use Arc Addition to Find Measures of Arcs

Find each measure in $\odot F$.

a. $m\overset{\frown}{AED}$ = 153°

$\overset{\frown}{AD}$

2

$\overset{\frown}{ABD}$ $\overset{\frown}{ACD}$

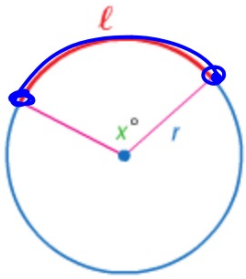
Hint: arc = central angle

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 $\frac{\ell}{2\pi r} = \frac{x}{360}$ or $\frac{x}{360}(C)$



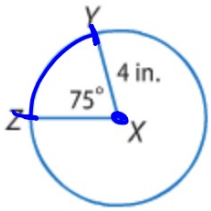
1. What is Circumference?
2. What fraction of the circle is it?

What fraction of the circle is it?

Example 5 Find Arc Length

Find the length of $\overset{\frown}{ZY}$. Round to the nearest hundredth.

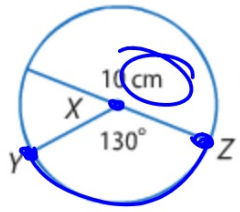
a.



$\frac{75}{360}(\pi \cdot 8)$

5.24 in

b.



$\frac{130}{360}(10\pi)$

11.34 cm

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

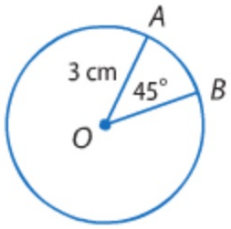
"find the measure" — degree

"find the length" — Circ.

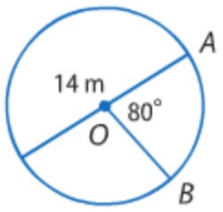
GuidedPractice

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

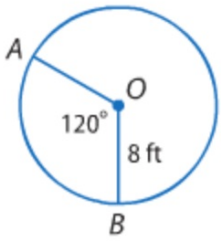
5A.



5B.



5C.



WB 10.2 prac.