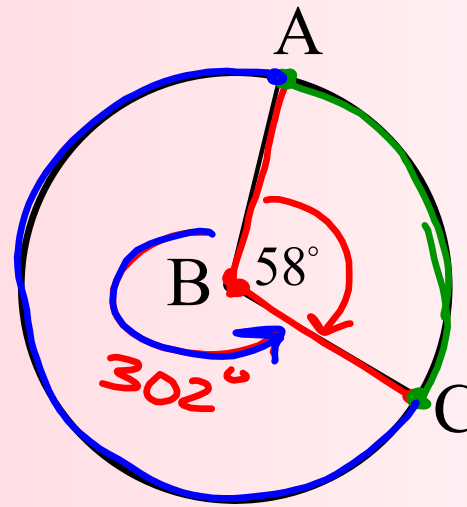# Geometry

# 12.3  Inscribed Angles

A **central angle** is an angle whose vertex is the center of a circle and whose sides pass through a pair of points on the circle forming an arc between those two points whose angle is **equal** to the central angle itself.
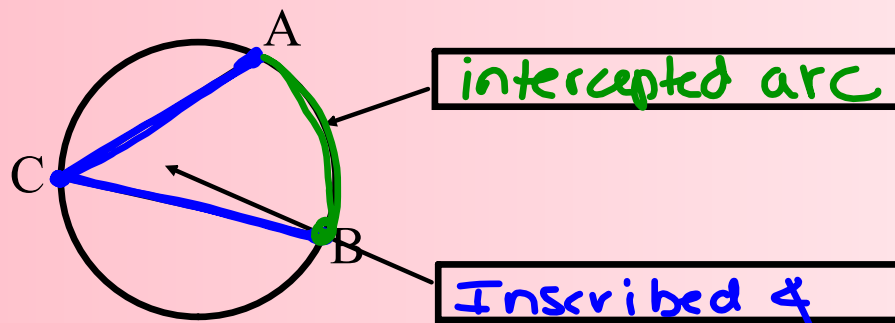
$\overset{\frown}{AC} = 58°$

$\overset{\frown}{ABC} = 302°$

An **inscribed angle** has a vertex that is on a circle and sides that are chords of the circle.

An **intercepted arc** is an arc with endpoints on the sides of an inscribed angle and its other points in the interior of the angle.
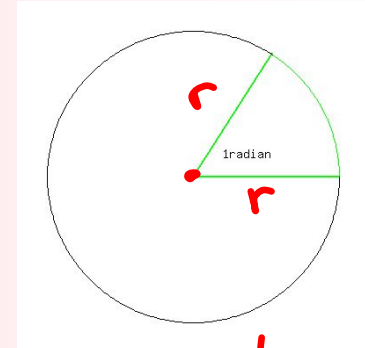


intercepted arc

Inscribed ∡

**CATEGORIZE EACH PICTURE AS EITHER A CENTRAL OR AN INSCRIBED ANGLE**



Central



chord

chord
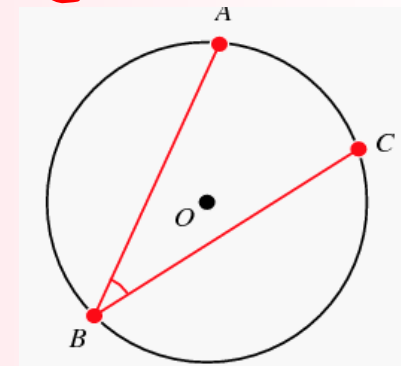
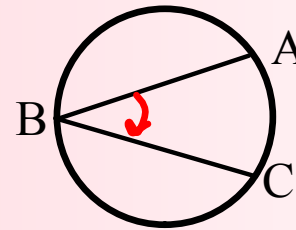Inscribed



r

1radian

r

Central



60°

18   18
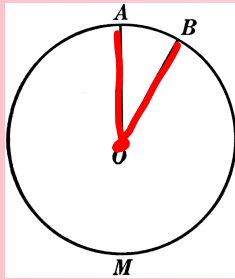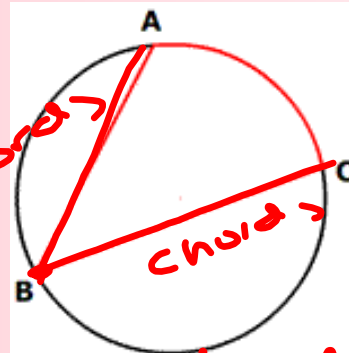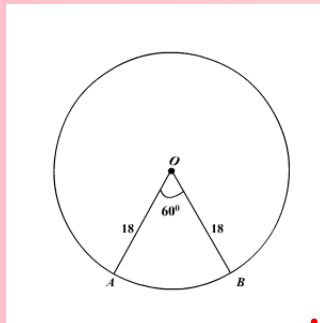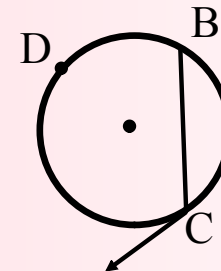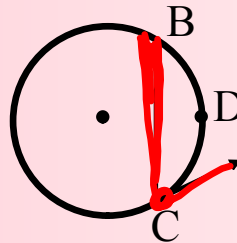
Central
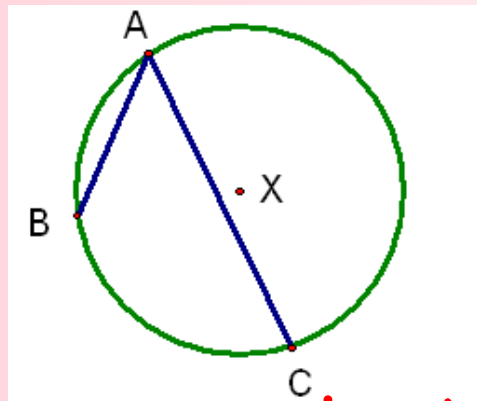


Inscribed



Inscribed

**Theorem 12-9** -- The measure of an inscribed angle is half the measure of its intercepted arc.

$$m\angle B = \frac{1}{2}m\,\overset{\frown}{AC}$$

**Theorem 12-10** -- The measure of an angle formed by a tangent and a chord is half the measure of the intercepted arc.

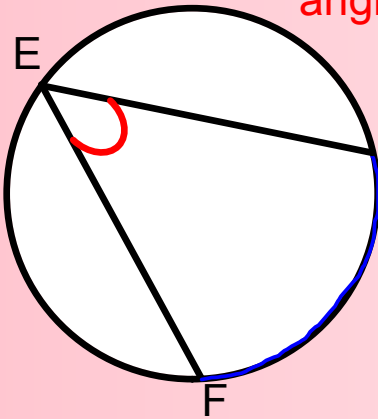$$m\angle C = \frac{1}{2}m\,\overset{\frown}{BDC}$$

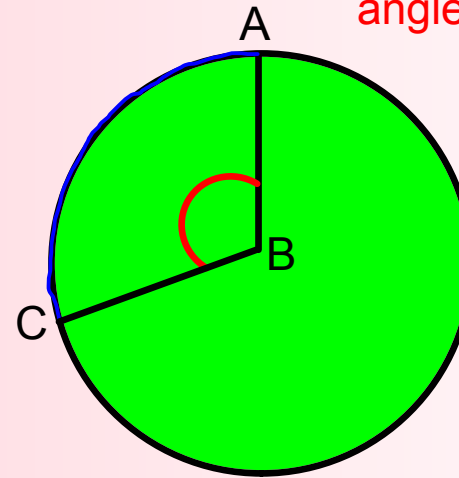Now we know what central angles an inscribed angles look like, let's find out how their properties.

Inscribed Angle

angle = arc / 2

Central Angle

angle = arc

E
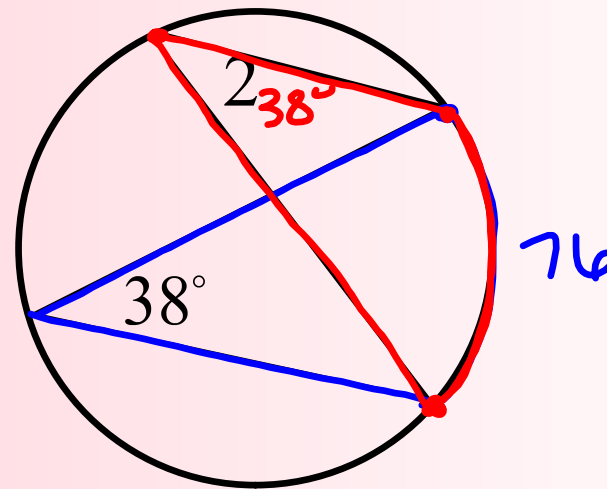
F

A

B

C

Move the formulas to decide which one matches with the given angle in the circle.
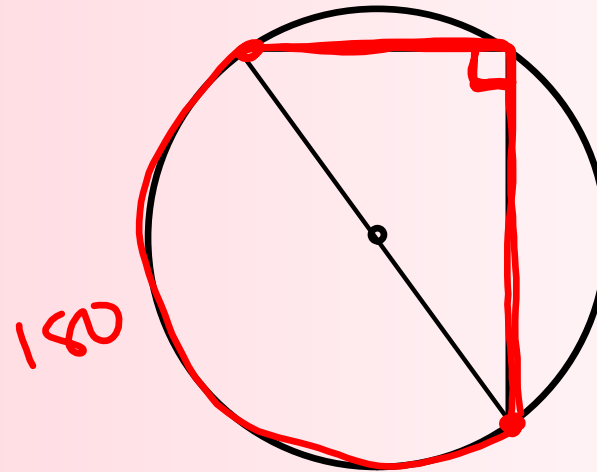
Corollaries to the Inscribed Angle Theorem
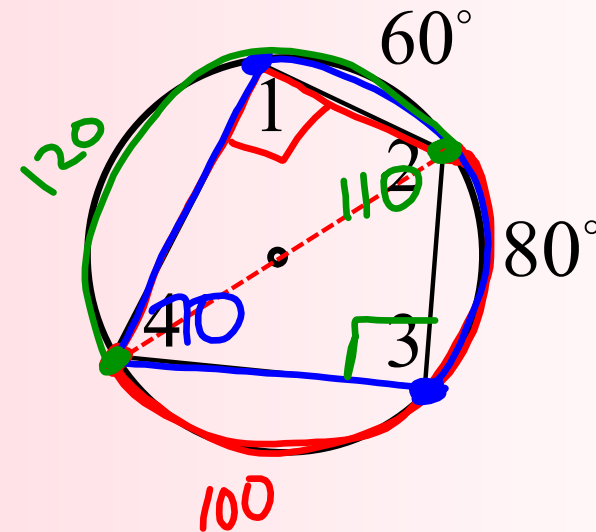1) Two inscribed angles that intercept the same arc are congruent.

Corollaries to the Inscribed Angle Theorem

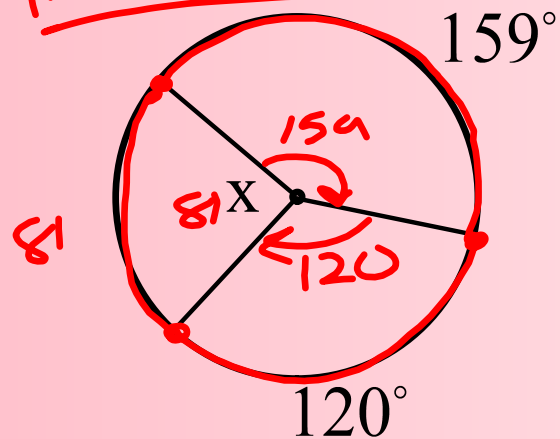2)  An angle inscribed in a semicircle is a right angle.

# Corollaries to the Inscribed Angle Theorem

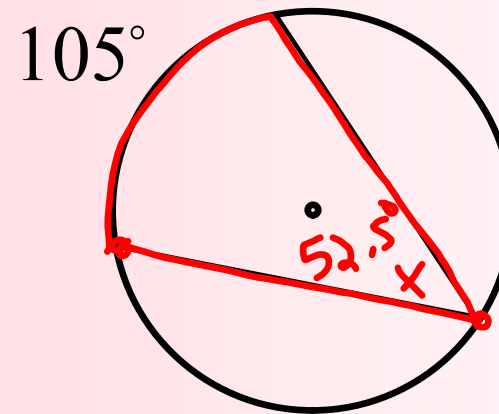3) The opposite angles of a quadrilateral inscribed in a circle are supplementary.
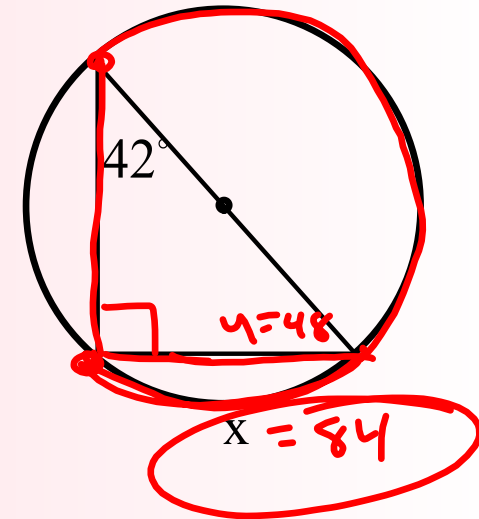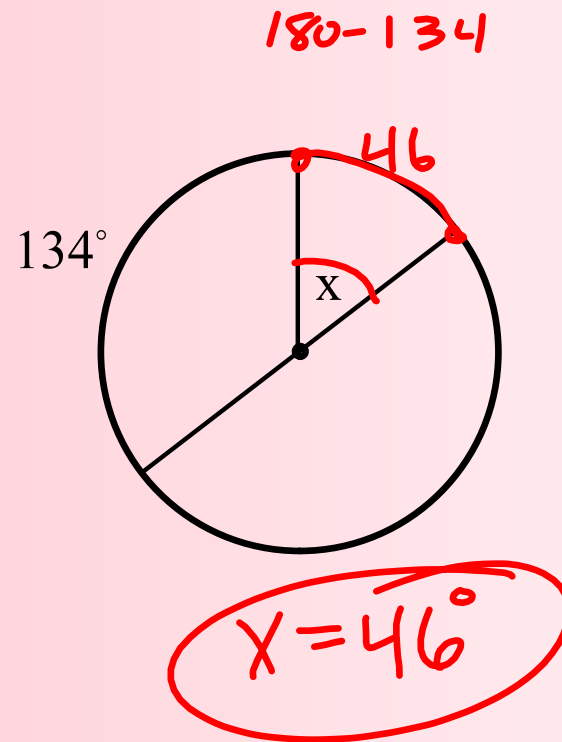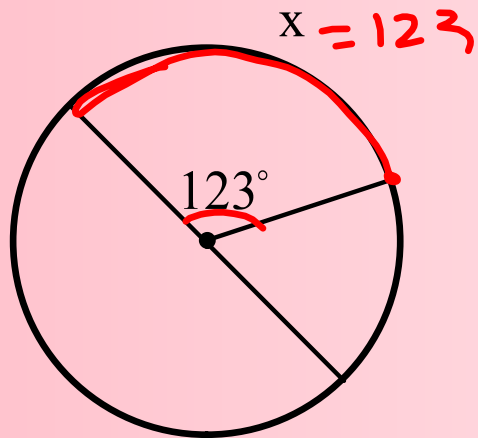
Find x.

$X = 81°$

159°

159

81    81 X

120

120°

$360 - 159 - 120$

105°

52.5 X

$X = \frac{1}{2}(105) = 52.5°$

# Find x.

x = 123

123°

180 - 134

46

134°

x

$X = 46°$

42°

4 = 48

x = 84
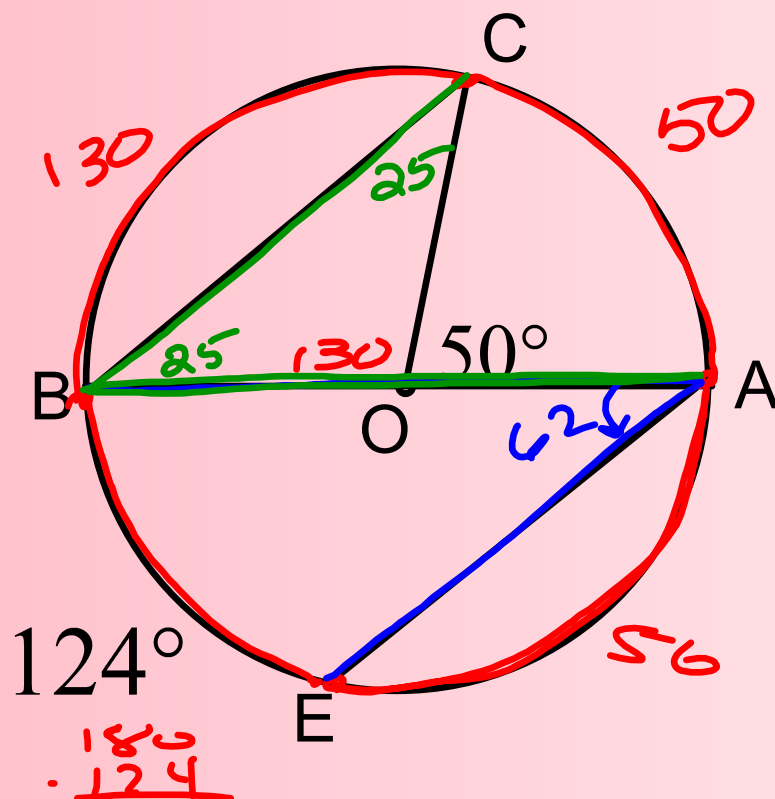
$m\widehat{CB} = 130°$        $m\sphericalangle A = 62°$

$m\widehat{AC} = 50°$        $m\sphericalangle B = 25°$

$m\widehat{AE} = 56°$        $m\sphericalangle C = 25°$
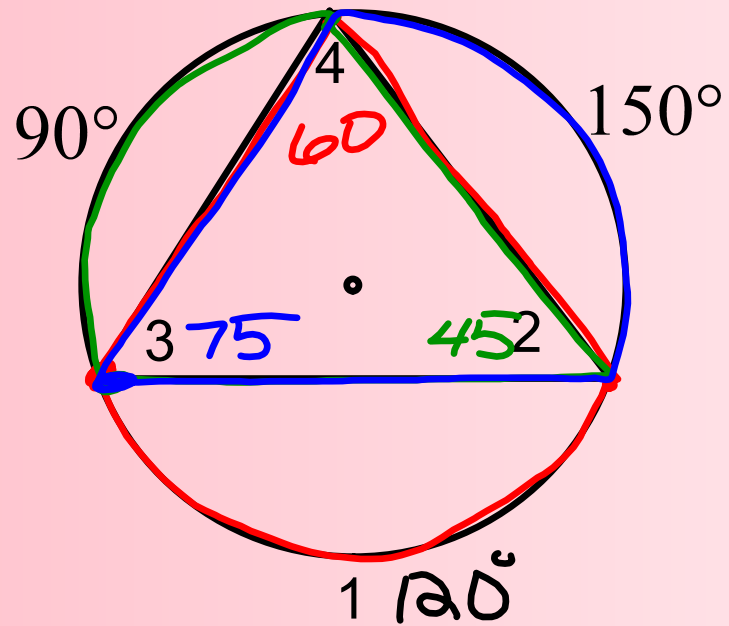
arc 1 = $120°$

$m\angle 2 = 45°$

$m\angle 3 = 75°$

$m\angle 4 = 60°$

X

125°

250°
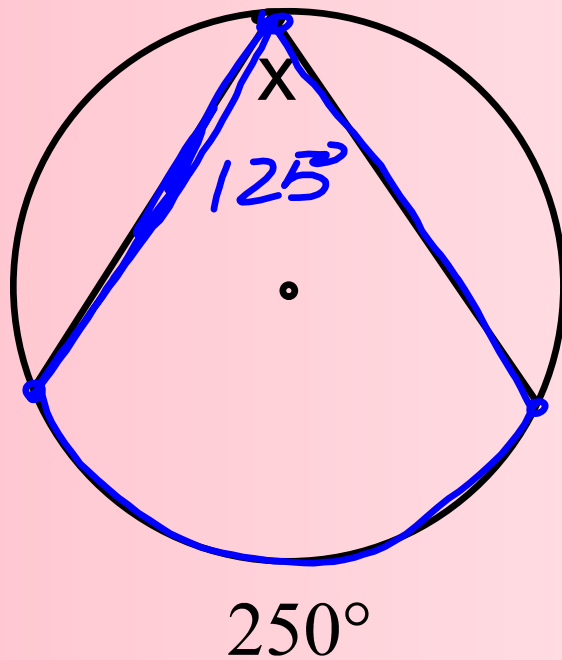
$$m \angle x = 125°$$

Find the values of x and y.
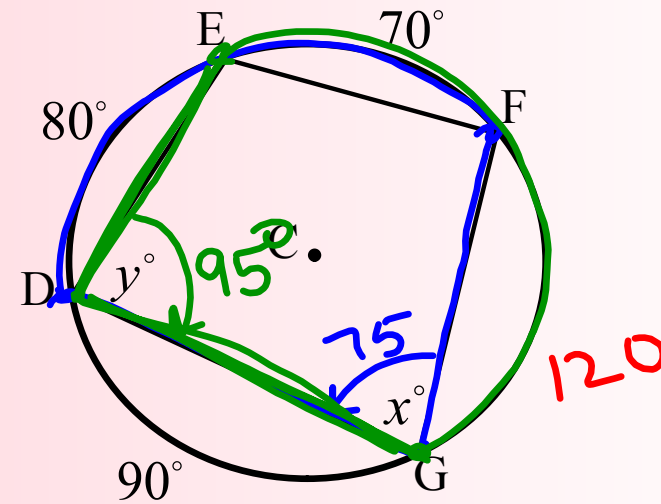
Find the values of a and b.



$b°$

$116°$

$32°$

$a°$

$58$
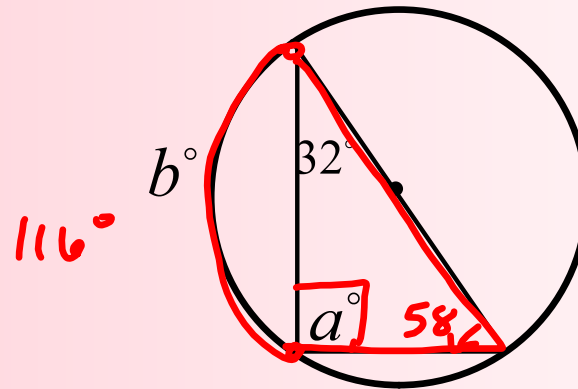
$\overline{RS}$ and $\overline{TU}$ are diameters of circle A. $\overrightarrow{RB}$ is tangent to circle A at point R.  Find $m\angle BRT$ and $m\angle TRS$.

# Assignment:

# Pg 681  1-3, 6-22