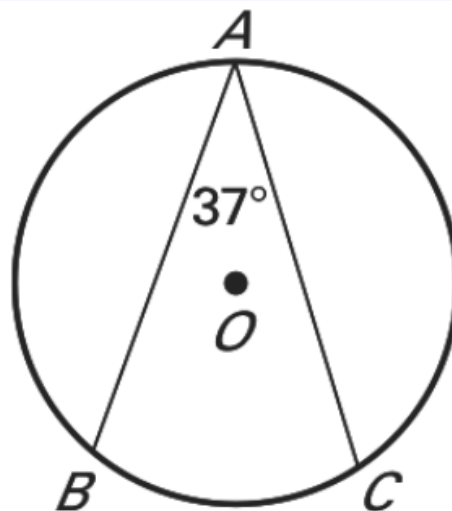


10.5 Apply Other Angle Relationships in Circles

In 10.4 we learned to do these type of problems:



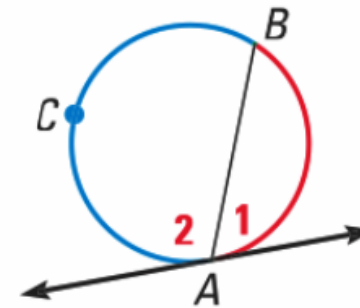
Find $m\widehat{BC}$

You know that the measure of an inscribed angle is half the measure of its intercepted arc. This is true even if one side of the angle is tangent to the circle.

THEOREM*For Your Notebook***THEOREM 10.11**

If a tangent and a chord intersect at a point on a circle, then the measure of each angle formed is one half the measure of its intercepted arc.

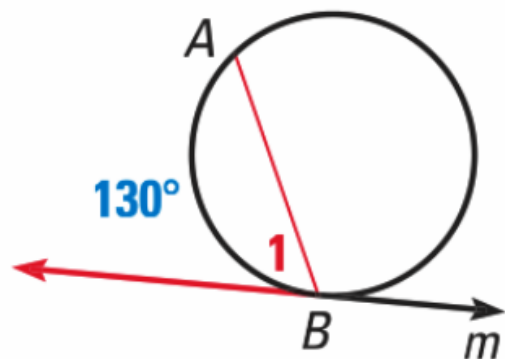
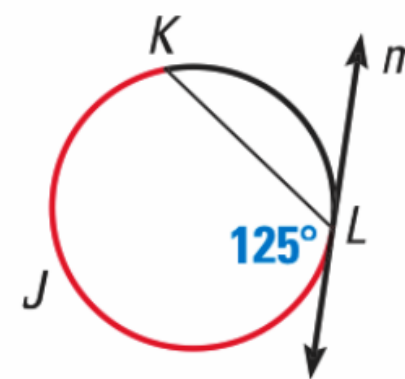
Proof: Ex. 27, p. 685



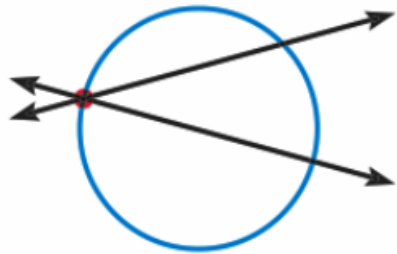
$$m\angle 1 = \frac{1}{2}m\widehat{AB} \quad m\angle 2 = \frac{1}{2}m\widehat{BCA}$$

EXAMPLE 1 Find angle and arc measures

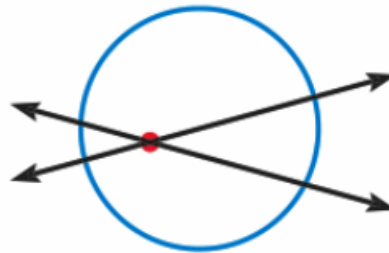
Line m is tangent to the circle. Find the measure of the red angle or arc.

a.**b.**

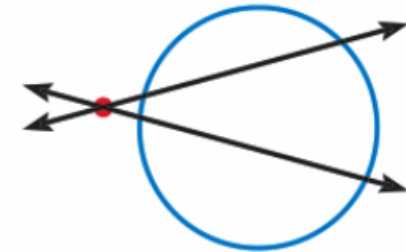
INTERSECTING LINES AND CIRCLES If two lines intersect a circle, there are three places where the lines can intersect.



on the circle



inside the circle



outside the circle

You can use Theorems 10.12 and 10.13 to find measures when the lines intersect *inside* or *outside* the circle.

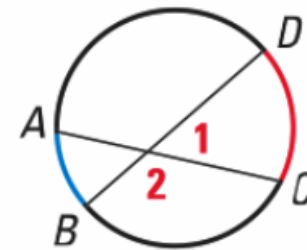
THEOREMS

For Your Notebook

THEOREM 10.12 Angles Inside the Circle Theorem

If two chords intersect *inside* a circle, then the measure of each angle is one half the *sum* of the measures of the arcs intercepted by the angle and its vertical angle.

Proof: Ex. 28, p. 685

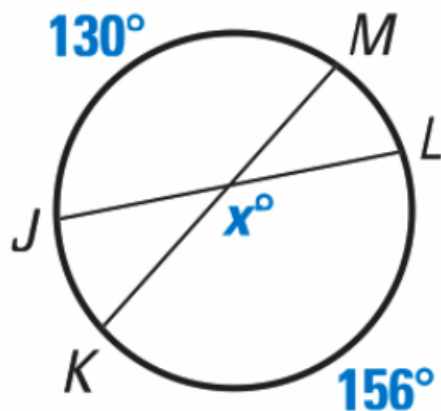


$$m\angle 1 = \frac{1}{2}(m\widehat{DC} + m\widehat{AB}),$$

$$m\angle 2 = \frac{1}{2}(m\widehat{AD} + m\widehat{BC})$$

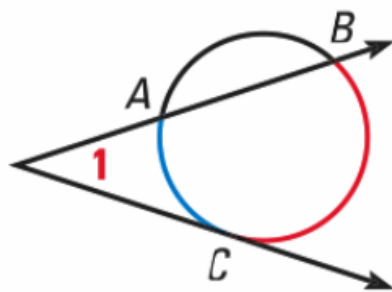
EXAMPLE 2**Find an angle measure inside a circle**

Find the value of x .

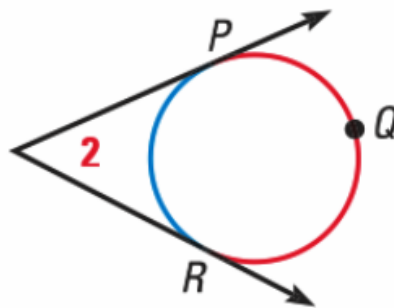


THEOREM 10.13 Angles Outside the Circle Theorem

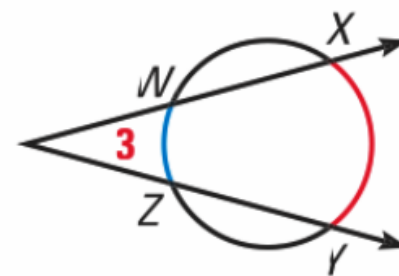
If a tangent and a secant, two tangents, or two secants intersect *outside* a circle, then the measure of the angle formed is one half the *difference* of the measures of the intercepted arcs.



$$m\angle 1 = \frac{1}{2}(m\widehat{BC} - m\widehat{AC})$$



$$m\angle 2 = \frac{1}{2}(m\widehat{PQR} - m\widehat{PR})$$

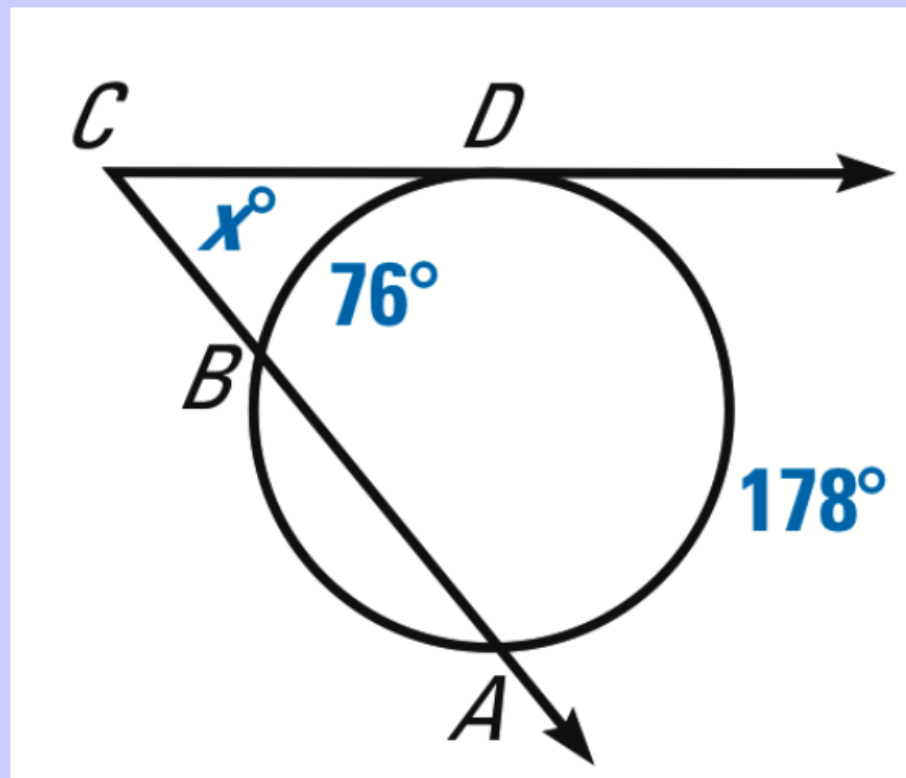


$$m\angle 3 = \frac{1}{2}(m\widehat{XY} - m\widehat{WZ})$$

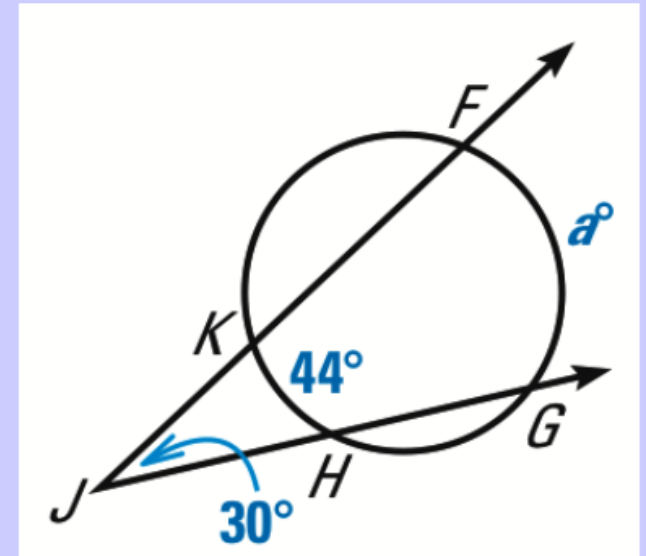
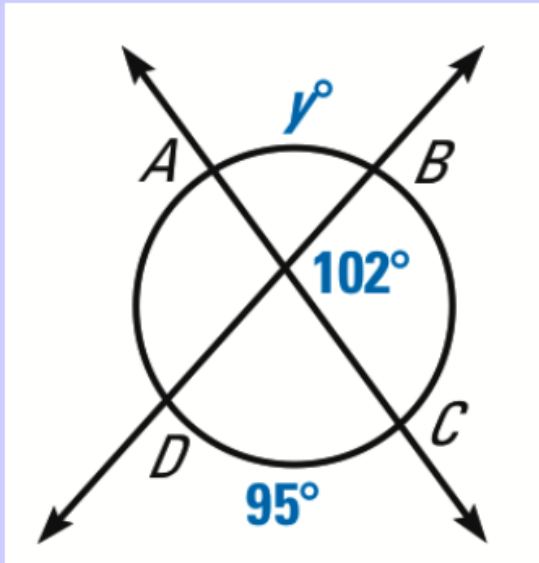
Proof: Ex. 29, p. 685

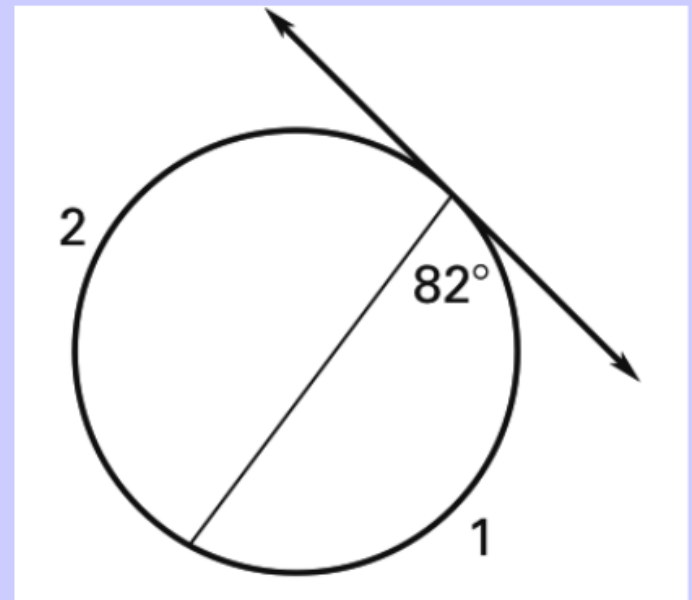
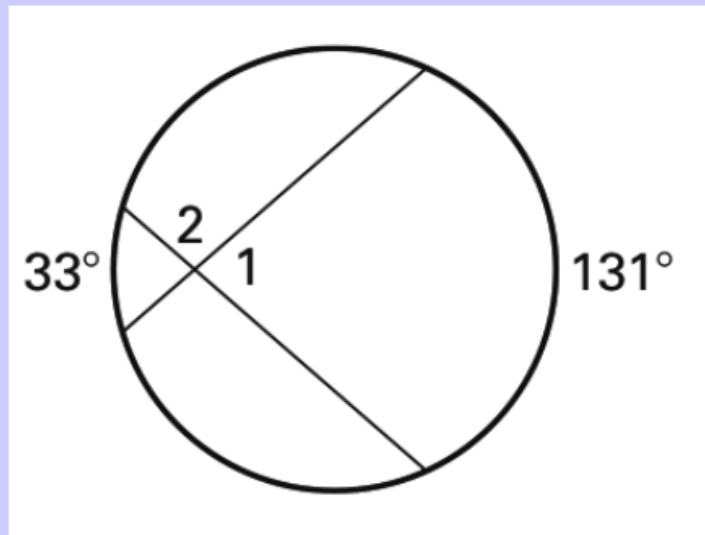
EXAMPLE 3 Find an angle measure outside a circle

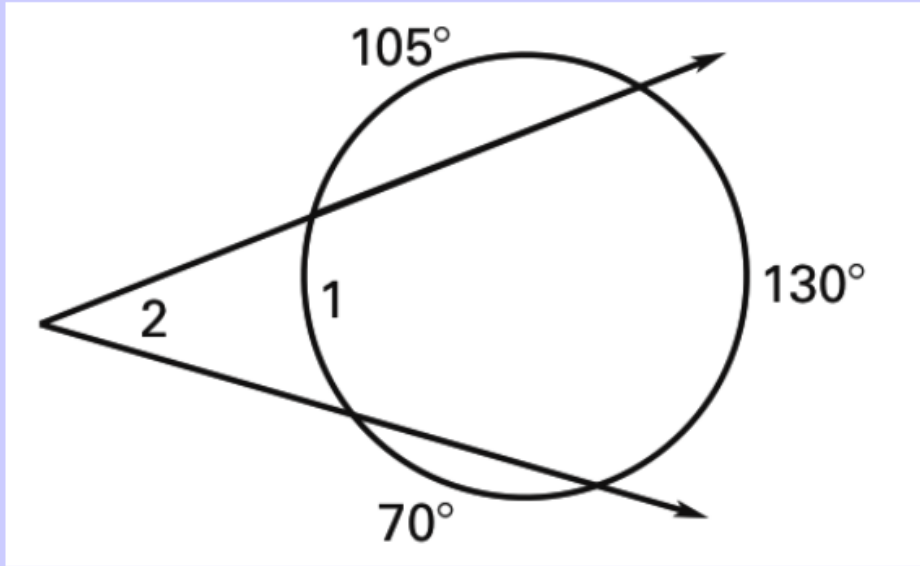
Find the value of x .



Find the value of the variable.







Assignment:

p. 683 (3-12, 16, 17,
22, 23)