

10.1 Use Properties of Tangents

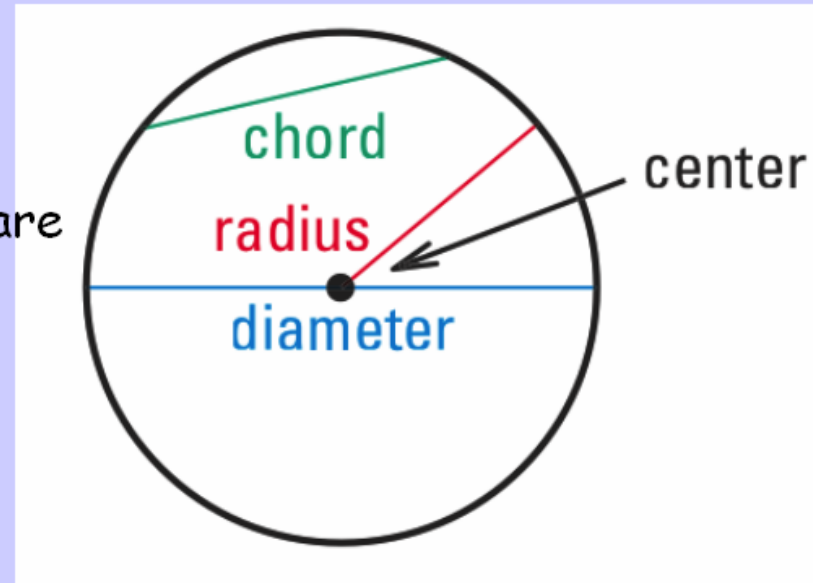
circle-The set of all points in a plane that are equidistant from a given point

center-The point that all points on the circle are equidistant

radius-A Segment whose endpoints are the center and any point on the circle

chord-A Segment whose endpoints are on the circle

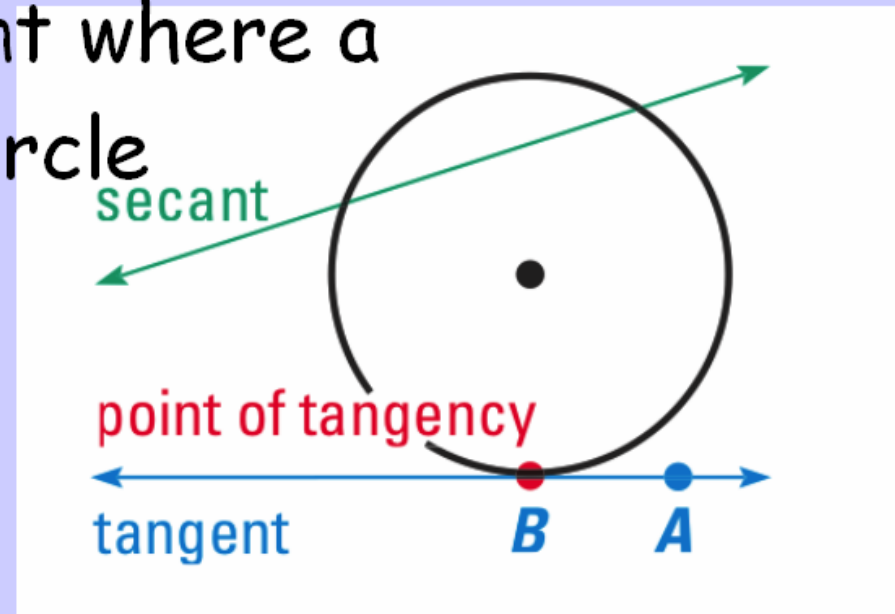
diameter-A Chord that goes through the center of the circle and whose endpoints are on the circle



secant-A line that intersects a circle in two points

tangent-A line in the plane of a circle that intersects the circle in exactly one point

point of tangency-The point where a tangent intersects with a circle



EXAMPLE 1 Identify special segments and lines

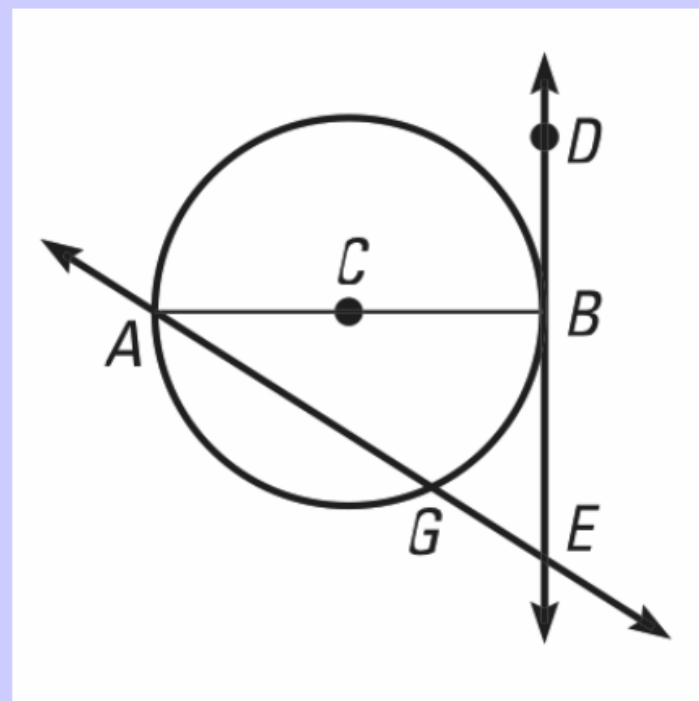
Tell whether the line, ray, or segment is best described as a *radius*, *chord*, *diameter*, *secant*, or *tangent* of $\odot C$.

a. \overline{AC}

b. \overline{AB}

c. \overrightarrow{DE}

d. \overleftrightarrow{AE}



EXAMPLE 2 Find lengths in circles in a coordinate plane

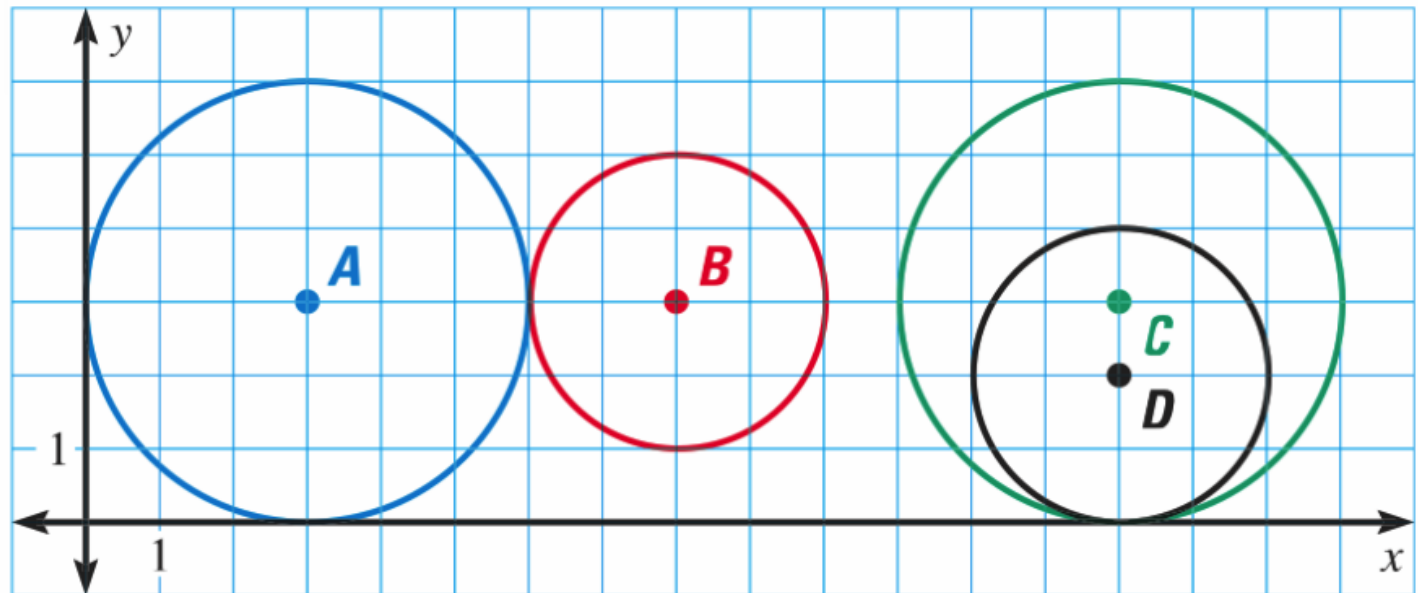
a. Radius of $\odot A$

Use the diagram to find the given lengths.

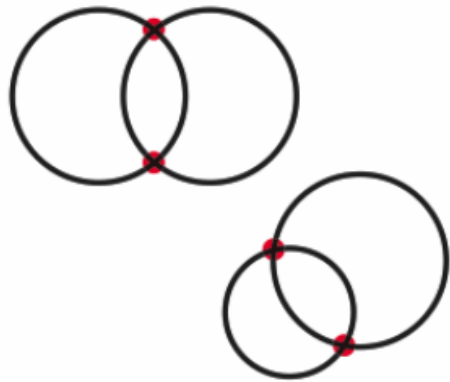
b. Diameter of $\odot A$

c. Radius of $\odot B$

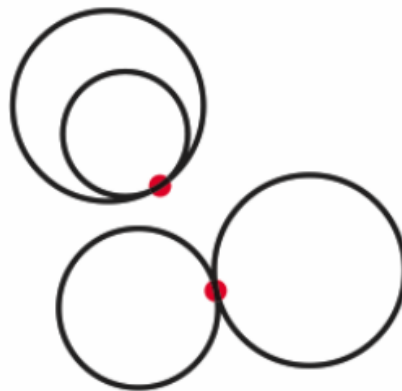
d. Diameter of $\odot B$



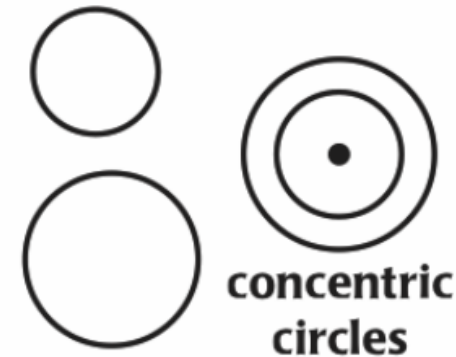
COPLANAR CIRCLES Two circles can intersect in two points, one point, or no points. Coplanar circles that intersect in one point are called *tangent circles*. Coplanar circles that have a common center are called *concentric*.



2 points of intersection



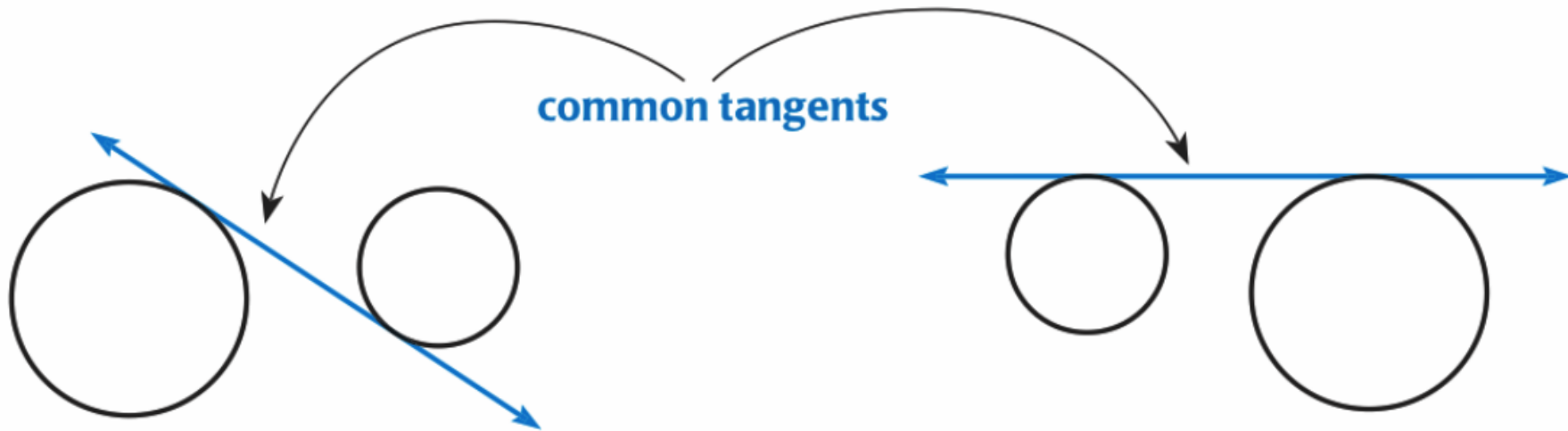
**1 point of intersection
(tangent circles)**



no points of intersection

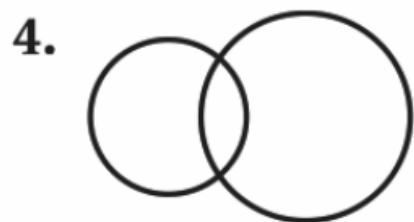
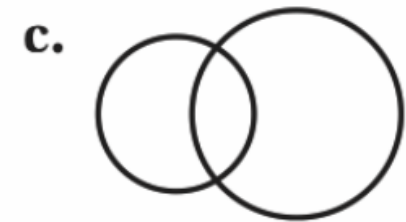
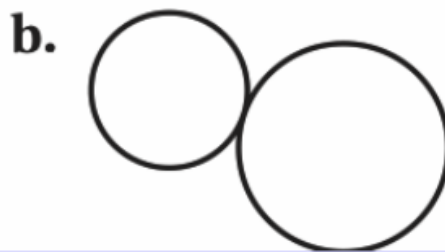
**concentric
circles**

COMMON TANGENTS A line, ray, or segment that is tangent to two coplanar circles is called a *common tangent*.



EXAMPLE 3 Draw common tangents

Tell how many common tangents the circles have and draw them.



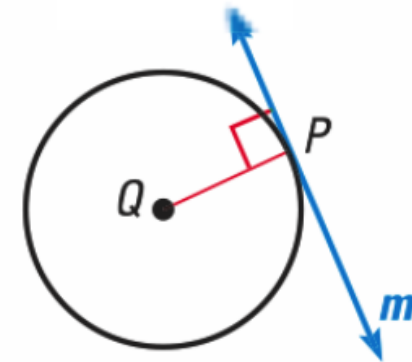
4, 5. See margin for art.



THEOREM*For Your Notebook***THEOREM 10.1**

In a plane, a line is tangent to a circle if and only if the line is perpendicular to a radius of the circle at its endpoint on the circle.

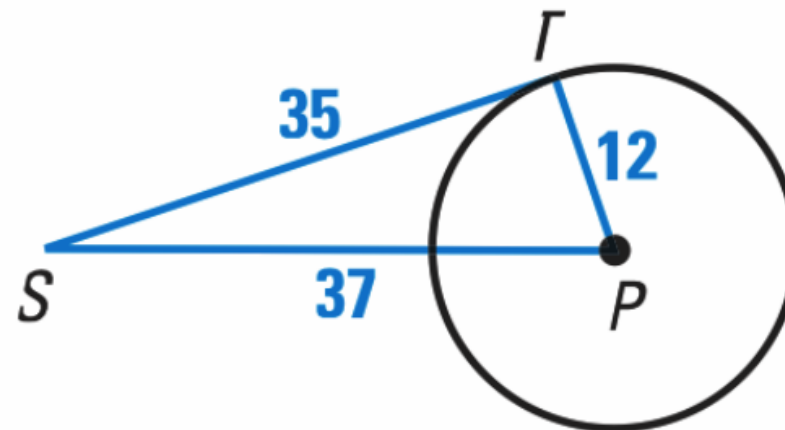
Proof: Exs. 39–40, p. 658



Line m is tangent to $\odot Q$
if and only if $m \perp \overline{QP}$.

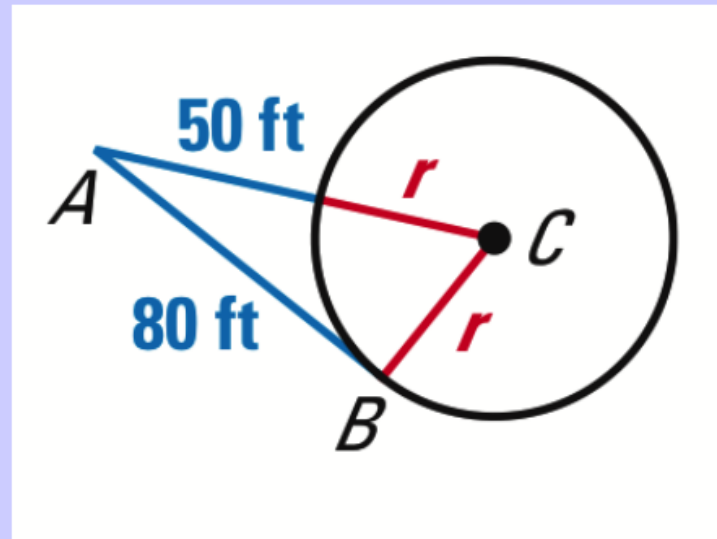
EXAMPLE 4 Verify a tangent to a circle

In the diagram, \overline{PT} is a radius of $\odot P$.
Is \overline{ST} tangent to $\odot P$?



EXAMPLE 5 Find the radius of a circle

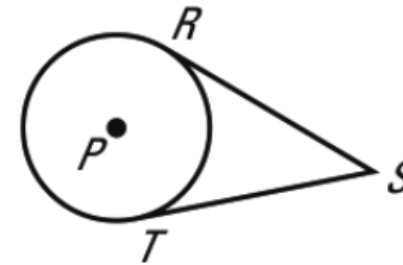
In the diagram, B is a point of tangency.
Find the radius r of $\odot C$.



THEOREM*For Your Notebook***THEOREM 10.2**

Tangent segments from a common external point are congruent.

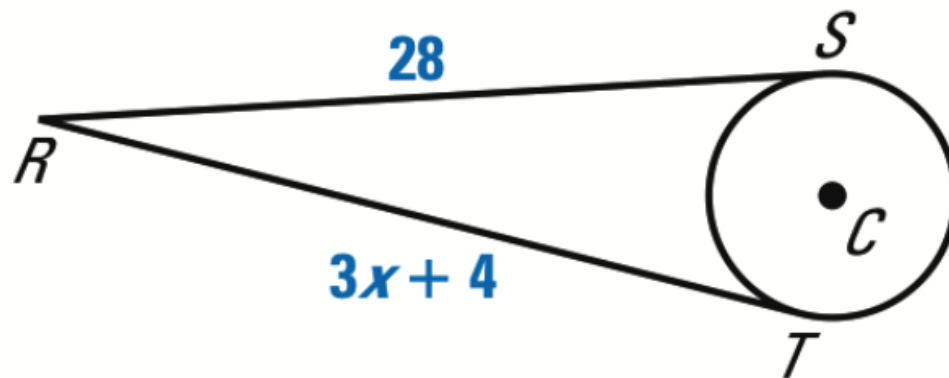
Proof: Ex. 41, p. 658



If \overline{SR} and \overline{ST} are tangent segments, then $\overline{SR} \cong \overline{ST}$.

EXAMPLE 6 Find the radius of a circle

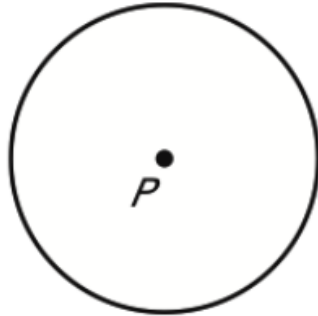
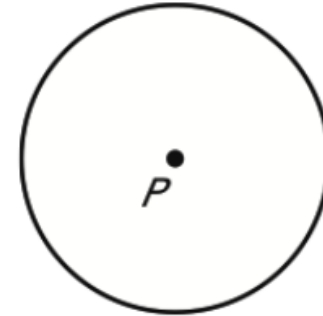
\overline{RS} is tangent to $\odot C$ at S and \overline{RT} is tangent to $\odot C$ at T . Find the value of x .



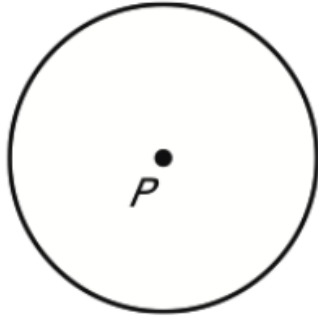
Assignment:

Pg. 655, 3-13, 15-

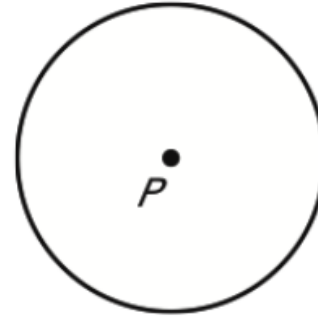
25odd, 27, 28, 35, 36

LESSON
10.1**Practice B***For use with pages 650–658***Use $\odot P$ to draw the described part of the circle.****1.** Draw a diameter and label it \overline{AB} .**2.** Draw a tangent ray and label it \overrightarrow{CD} .

3. Draw a secant and label it \overline{EF} .

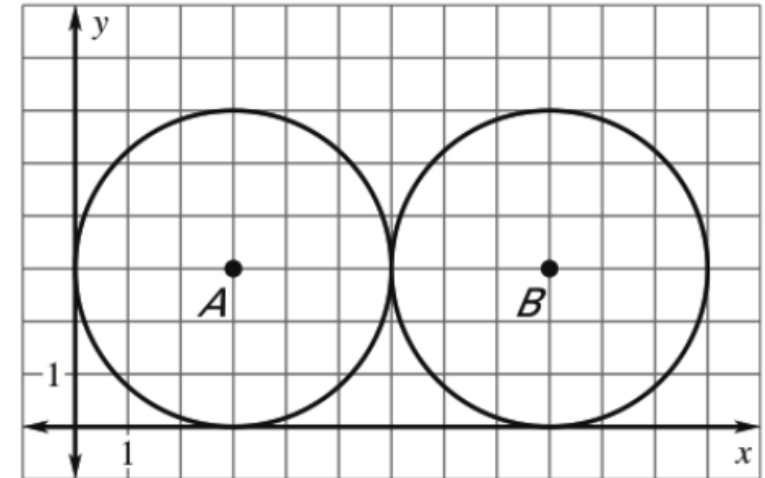


4. Draw a chord and label it \overline{GH} .



Use the diagram to determine if the statement is *true* or *false*.

5. The distance between the centers of the circles is equal to the length of the diameter of each circle.
6. The lines $y = 0$ and $y = 4$ represent all the common tangents of the two circles.
7. The circles intersect at the point $(6, 3)$.
8. Suppose the two circles shown are inscribed in a rectangle. The perimeter of the rectangle is 36 units.



Draw two circles that have the given number of common tangents.

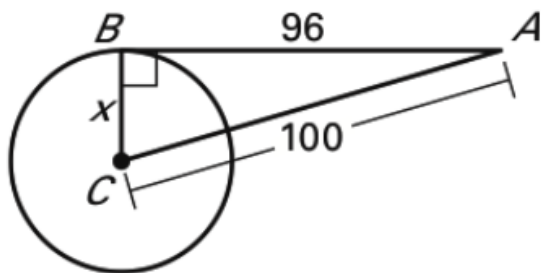
9. 3

10. 2

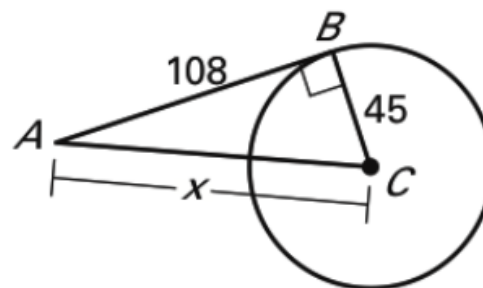
11. 0

In Exercises 12–17, \overline{BC} is a radius of $\odot C$ and \overline{AB} is tangent to $\odot C$. Find the value of x .

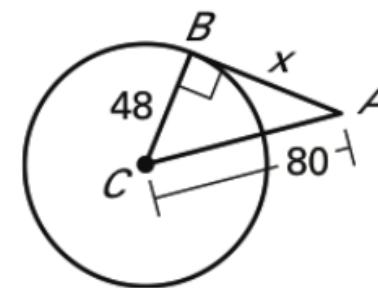
12.

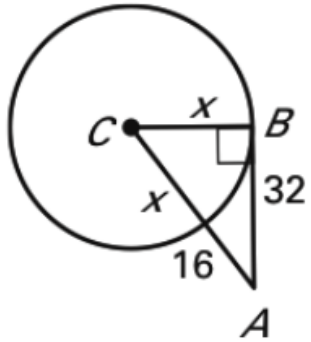
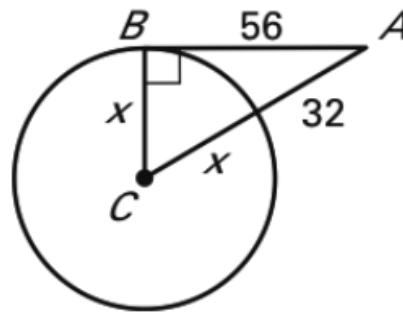
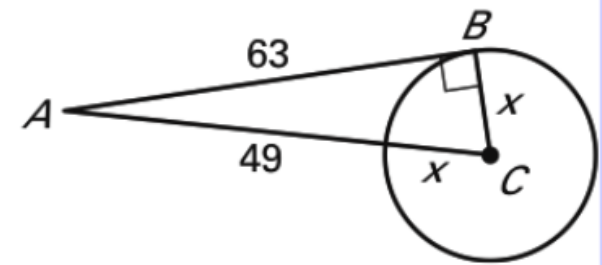


13.



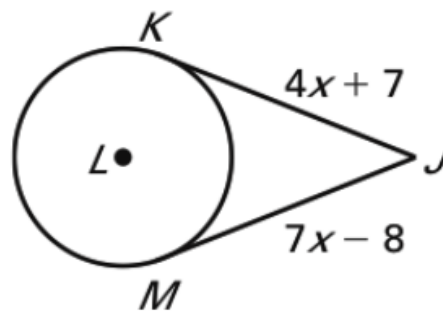
14.



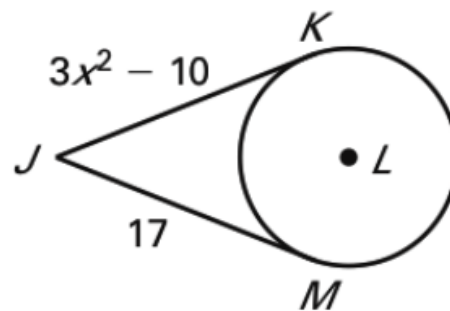
15.**16.****17.**

The points K and M are points of tangency. Find the value(s) of x .

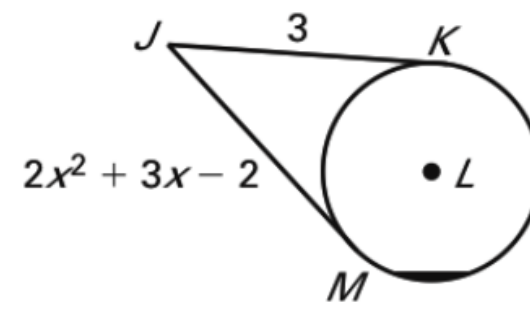
18.



19.



20.



Assignment:
10.1 Worksheet