Chapter 11 Summary and Review

VOCABULARY

- **chord,** *p. 589*
- **secant,** *p. 589*
- **tangent,** *p. 589*
- **point of tangency,** *p. 589*
- **tangent segment,** *p. 597*
- **minor arc,** *p. 601*
- **major arc,** *p. 601*
- **measure of a minor arc,** *p. 601*
- **measure of a major arc,** *p. 601*
- **semicircle,** *p. 601*
- **congruent circles,** *p. 602*
- **congruent arcs,** *p. 602*
- **arc length,** *p. 603*
- **inscribed angle,** *p. 614*
- **intercepted arc,** *p. 614*
- **inscribed,** *p. 615*
- **circumscribed,** *p. 615*
- **standard equation of a circle,** *p. 628*
- **rotation,** *p. 633*
- **center of rotation,** *p. 633*
- **angle of rotation,** *p. 633*
- **rotational symmetry,** *p. 634*

VOCABULARY REVIEW

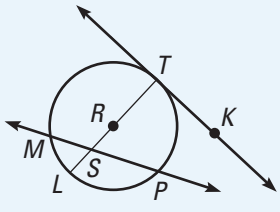
Fill in the blank.

1. A __?__ is a line that intersects a circle in two points.
2. A polygon is __?__ in a circle if all of its vertices lie on the circle.
3. A line in the plane of a circle that intersects the circle in exactly one point is called a __?__.
4. If the endpoints of an arc are the endpoints of a diameter, then the arc is a __?__.
5. An __?__ is an angle whose vertex is on a circle and whose sides contain chords of the circle.
6. A __?__ is a segment whose endpoints are points on a circle.
7. A __?__ is a transformation in which a figure is turned about a fixed point.

11.1 PARTS OF A CIRCLE

Examples on pp. 589–590

EXAMPLE **Identify a chord, a secant, a tangent, a diameter, the center, and a point of tangency.**



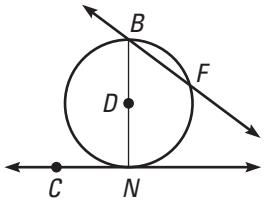
$\overline{MP}$ is a chord. $\overleftrightarrow{MP}$ is a secant. $\overleftrightarrow{TK}$ is a tangent.

$\overline{LT}$ is a diameter. R is the center. T is a point of tangency.

Tell whether the point, line, or segment is best described as a *chord*, a *secant*, a *tangent*, a *diameter*, a *radius*, the *center*, or a *point of tangency*.

8. $\overline{BN}$ **9.** N **10.** $\overline{BF}$

11. D **12.** $\overleftrightarrow{CN}$ **13.** $\overleftrightarrow{BF}$



11.2 Properties of Tangents

Examples on pp. 595–597

EXAMPLE $\overleftrightarrow{AB}$ **is tangent to** $\odot C$. **Find** CB.

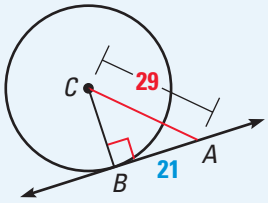
$(AC)^2 = (AB)^2 + (CB)^2$ Pythagorean Theorem

$29^2 = 21^2 + (CB)^2$ Substitute 29 for AC, and 21 for AB.

$841 = 441 + (CB)^2$ Multiply.

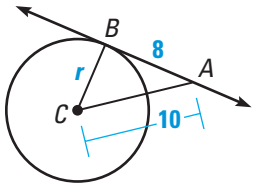
$400 = (CB)^2$ Subtract 441 from each side.

$20 = CB$ Find the positive square root.



$\overleftrightarrow{AB}$ **is tangent to** $\odot C$. **Find the value of** r.

14.



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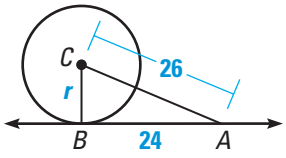

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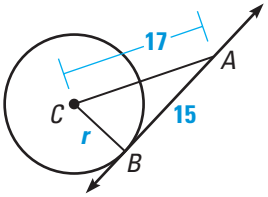
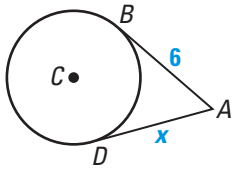


$\overline{AB}$ **and** $\overline{AD}$ **are tangent to** $\odot C$. **Find the value of** x.

17.



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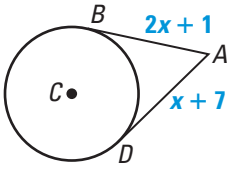

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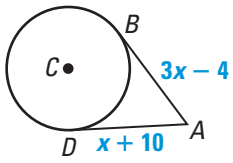


11.3 Arcs and Central Angles

Examples on pp. 601–603

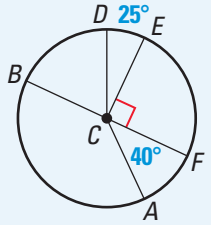
EXAMPLES **Find the measure of the arc.**

a. $m\overset{\frown}{DF}$ **b.** $m\overset{\frown}{DA}$ **c.** $m\overset{\frown}{ABD}$

a. $m\overset{\frown}{DF} = m\overset{\frown}{DE} + m\overset{\frown}{EF} = 25° + 90° = 115°$

b. $m\overset{\frown}{DA} = m\overset{\frown}{DF} + m\overset{\frown}{AF} = 115° + 40° = 155°$

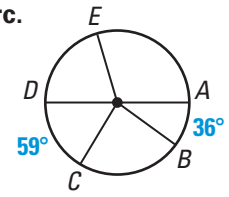
c. $m\overset{\frown}{ABD} = 360° - m\overset{\frown}{DA} = 360° - 155° = 205°$



$\overline{AD}$ is a diameter and $m\widehat{CE} = 121°$. Find the measure of the arc.

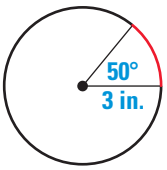
20. $\widehat{DE}$ **21.** $\widehat{AE}$ **22.** $\widehat{AEC}$

23. $\widehat{BC}$ **24.** $\widehat{BDC}$ **25.** $\widehat{BDA}$



Find the length of the red arc. Round your answer to the nearest hundredth.

26.



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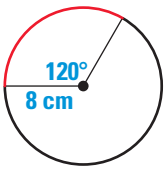

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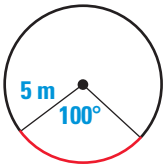
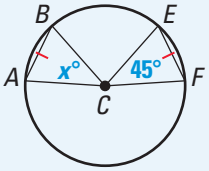


11.4 Arcs and Chords

Examples on pp. 608–610

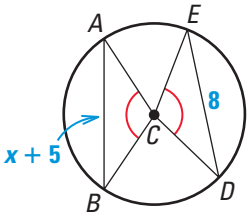
EXAMPLE **Find the value of x.**



Because $\overline{AB} \cong \overline{EF}$, it follows that $\widehat{AB} \cong \widehat{EF}$.
So, $m\widehat{AB} = m\widehat{EF} = 45°$, and $x = 45$.

Find the value of x.

29.



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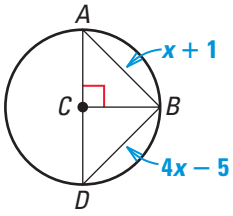

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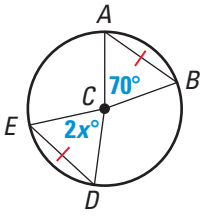

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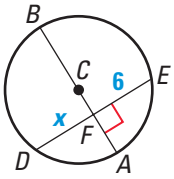

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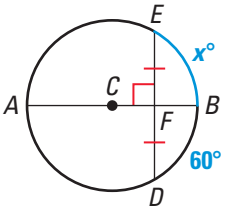

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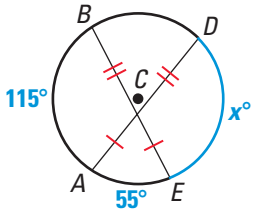
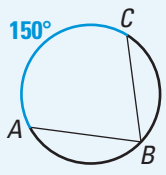


11.5 Inscribed Angles and Polygons

Examples on pp. 614–616

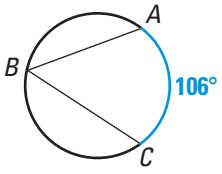
EXAMPLE **Find the measure of the inscribed angle.**



$$m\angle ABC = \frac{1}{2}m\widehat{AC} = \frac{1}{2}(150°) = 75°$$

Find the measure of the inscribed angle or intercepted arc.

35.



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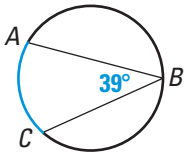
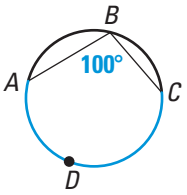
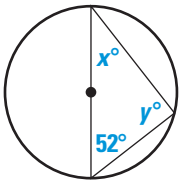


37.

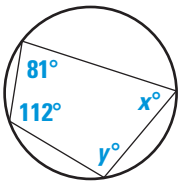


Find the value of *x* and *y*.

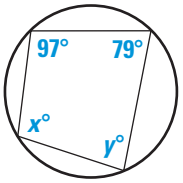
38.



39.



40.

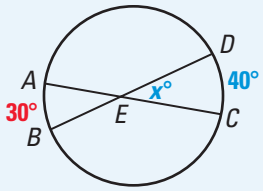


11.6 Properties of Chords

Examples on pp. 620–622

EXAMPLES **Find the value of *x*.**

a.

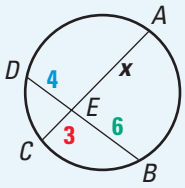


$$x^\circ = \frac{1}{2}(m\widehat{AB} + m\widehat{DC})$$

$$= \frac{1}{2}(30^\circ + 40^\circ)$$

$$= 35^\circ$$

b.



$$EC \cdot EA = ED \cdot EB$$

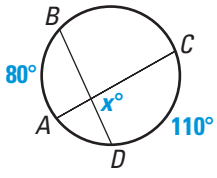
$$3 \cdot x = 4 \cdot 6$$

$$3x = 24$$

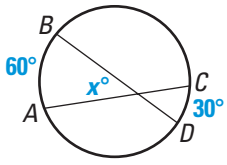
$$x = 8$$

Find the value of *x*.

41.



42.



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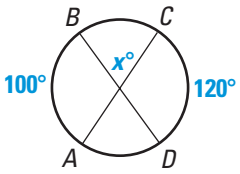

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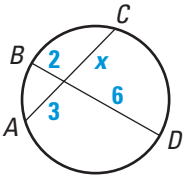

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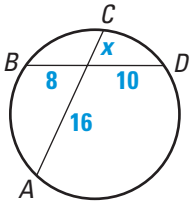

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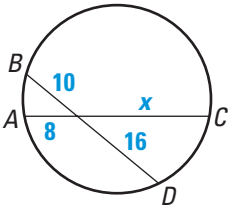


11.7 Equations of Circles

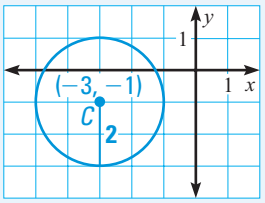
Examples on pp. 627–629

EXAMPLE **Write the standard equation of the circle.**

$\odot C$ has center $(-3, -1)$ and radius 2. Its standard equation is

$$(x - (-3))^2 + (y - (-1))^2 = 2^2$$

$$(x + 3)^2 + (y + 1)^2 = 4.$$



Write the standard equation of the circle with the given center and radius.

47. center $(2, 5)$, radius 3 **48.** center $(-4, -1)$, radius 4 **49.** center $(5, -2)$, radius 7

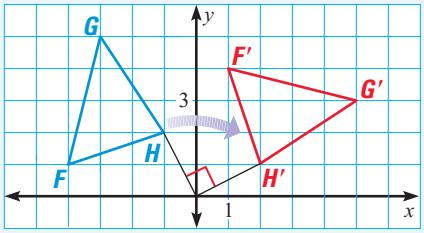
Give the radius and the coordinates of the center of the circle with the given equation. Then graph the circle.

50. $(x + 4)^2 + (y - 1)^2 = 9$ **51.** $(x - 2)^2 + (y + 3)^2 = 16$ **52.** $x^2 + y^2 = 25$

11.8 Rotations

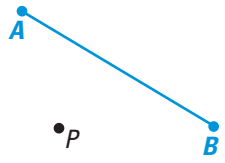
Examples on pp. 633–635

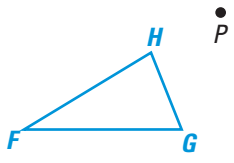
EXAMPLE **Rotate the triangle with vertices $F(-4, 1)$, $G(-3, 5)$, and $H(-1, 2)$ 90° clockwise about the origin.**

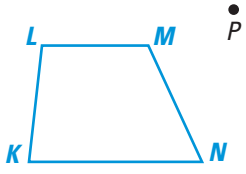


Trace the figure and point P on paper. Use a straightedge and protractor to rotate the figure clockwise the given number of degrees about P.

53. 90° counterclockwise **54.** 90° clockwise **55.** 180°







56. Does the figure shown at the right have rotational symmetry? If so, describe the rotations that map the figure onto itself.