10 CHAPTER SUMMARY

BIG IDEAS

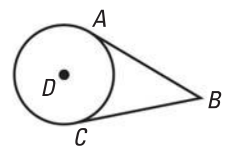
For Your Notebook

Big Idea 1

Using Properties of Segments that Intersect Circles

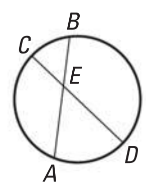
You learned several relationships between tangents, secants, and chords.

Some of these relationships can help you determine that two chords or tangents are congruent. For example, tangent segments from the same exterior point are congruent.



$\overline{AB} \cong \overline{CB}$

Other relationships allow you to find the length of a secant or chord if you know the length of related segments. For example, with the Segments of a Chord Theorem you can find the length of an unknown chord segment.



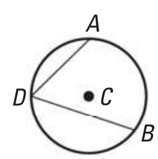
$EA \cdot EB = EC \cdot ED$

Big Idea 2

Applying Angle Relationships in Circles

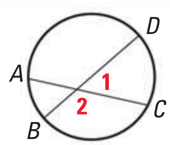
You learned to find the measures of angles formed inside, outside, and on circles.

Angles formed on circles



$m\angle ADB = \frac{1}{2}m\overparen{AB}$

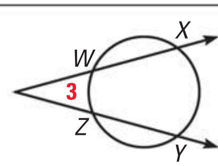
Angles formed inside circles



$m\angle 1 = \frac{1}{2}(m\overparen{AB} + m\overparen{CD})$,

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

Angles formed outside circles



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

Big Idea 3

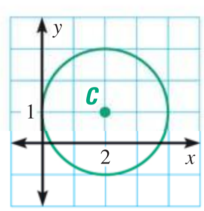
Using Circles in the Coordinate Plane

The standard equation of $\odot C$ is:

$(x - h)^2 + (y - k)^2 = r^2$

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

$(x - 2)^2 + (y - 1)^2 = 4$



10 CHAPTER REVIEW

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classzone.com
- Multi-Language Glossary
- Vocabulary practice

REVIEW KEY VOCABULARY

For a list of postulates and theorems, see pp. 926–931.

- circle, *p. 651*
  center, radius, diameter
- chord, *p. 651*
- secant, *p. 651*
- tangent, *p. 651*
- central angle, *p. 659*
- minor arc, *p. 659*
- major arc, *p. 659*
- semicircle, *p. 659*
- measure of a minor arc, *p. 659*
- measure of a major arc, *p. 659*
- congruent circles, *p. 660*
- congruent arcs, *p. 660*
- inscribed angle, *p. 672*
- intercepted arc, *p. 672*
- inscribed polygon, *p. 674*
- circumscribed circle, *p. 674*
- segments of a chord, *p. 689*
- secant segment, *p. 690*
- external segment, *p. 690*
- standard equation of a circle, *p. 699*

VOCABULARY EXERCISES

1. Copy and complete: If a chord passes through the center of a circle, then it is called a(n) __?__.

2. Draw and *describe* an inscribed angle and an intercepted arc.

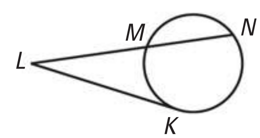
3. **WRITING** *Describe* how the measure of a central angle of a circle relates to the measure of the minor arc and the measure of the major arc created by the angle.

In Exercises 4–6, match the term with the appropriate segment.

4. Tangent segment **A.** $\overline{LM}$

5. Secant segment **B.** $\overline{KL}$

6. External segment **C.** $\overline{LN}$



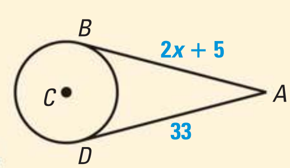
REVIEW EXAMPLES AND EXERCISES

Use the review examples and exercises below to check your understanding of the concepts you have learned in each lesson of Chapter 10.

10.1 Use Properties of Tangents *pp. 651–658*

EXAMPLE

In the diagram, *B* and *D* are points of tangency on ⊙*C*. Find the value of *x*.



Use Theorem 10.2 to find x.

$AB = AD$ — **Tangent segments from the same point are ≅.**

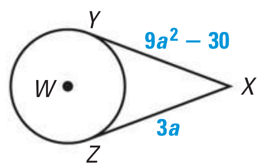
$2x + 5 = 33$ — **Substitute.**

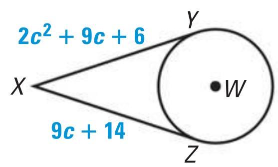
$x = 14$ — **Solve for *x*.**

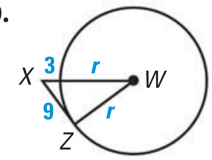
EXAMPLES 5 and 6
on p. 654
for Exs. 7–9

EXERCISES

Find the value of the variable. Y and Z are points of tangency on $\odot W$.

7. 

8. 

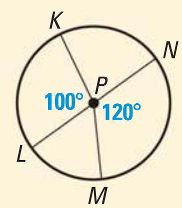
9. 

10.2 Find Arc Measures

pp. 659–663

EXAMPLE

Find the measure of the arc of $\odot P$. In the diagram, $\overline{LN}$ is a diameter.



a. $\overset{\frown}{MN}$ **b.** $\overset{\frown}{NLM}$ **c.** $\overset{\frown}{NML}$

a. $\overset{\frown}{MN}$ is a minor arc, so $m\overset{\frown}{MN} = m\angle MPN = 120°$.

b. $\overset{\frown}{NLM}$ is a major arc, so $m\overset{\frown}{NLM} = 360° - 120° = 240°$.

c. $\overset{\frown}{NML}$ is a semicircle, so $m\overset{\frown}{NML} = 180°$.

EXAMPLES 1 and 2
on pp. 659–660
for Exs. 10–13

EXERCISES

Use the diagram above to find the measure of the indicated arc.

10. $\overset{\frown}{KL}$ **11.** $\overset{\frown}{LM}$ **12.** $\overset{\frown}{KM}$ **13.** $\overset{\frown}{KN}$

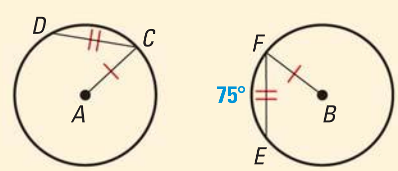
10.3 Apply Properties of Chords

pp. 664–670

EXAMPLE

In the diagram, $\odot A \cong \odot B$, $\overline{CD} \cong \overline{FE}$, and $m\overset{\frown}{FE} = 75°$. Find $m\overset{\frown}{CD}$.

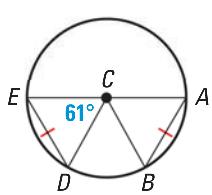
By Theorem 10.3, $\overline{CD}$ and $\overline{FE}$ are congruent chords in congruent circles, so the corresponding minor arcs $\overset{\frown}{FE}$ and $\overset{\frown}{CD}$ are congruent. So, $m\overset{\frown}{CD} = m\overset{\frown}{FE} = 75°$.

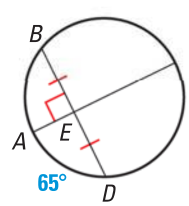


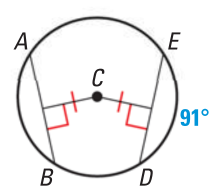
EXAMPLES 1, 3, and 4
on pp. 664, 666
for Exs. 14–16

EXERCISES

Find the measure of $\overset{\frown}{AB}$.

14. 

15. 

16. 

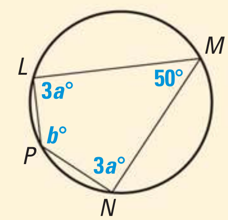
10 CHAPTER REVIEW

10.4 Use Inscribed Angles and Polygons

pp. 672–679

EXAMPLE

Find the value of each variable.



LMNP is inscribed in a circle, so by Theorem 10.10, opposite angles are supplementary.

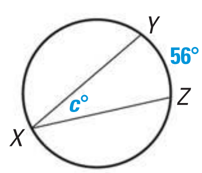
$m\angle L + m\angle N = 180°$	$m\angle P + m\angle M = 180°$
$3a° + 3a° = 180°$	$b° + 50° = 180°$
$6a = 180$	$b = 130$
$a = 30$	

EXERCISES

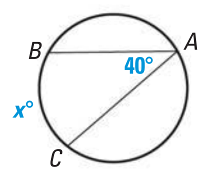
EXAMPLES 1, 2, and 5 on pp. 672–675 for Exs. 17–19

Find the value(s) of the variable(s).

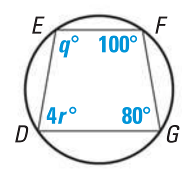
17.



18.



19.

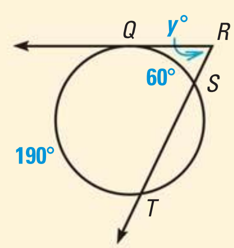


10.5 Apply Other Angle Relationships in Circles

pp. 680–686

EXAMPLE

Find the value of *y*.



The tangent $\overrightarrow{RQ}$ and secant $\overrightarrow{RT}$ intersect outside the circle, so you can use Theorem 10.13 to find the value of *y*.

$y° = \frac{1}{2}(m\overset{\frown}{QT} - m\overset{\frown}{SQ})$ **Use Theorem 10.13.**

$y° = \frac{1}{2}(190° - 60°)$ **Substitute.**

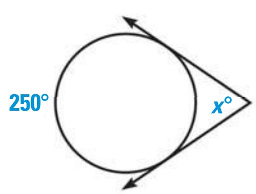
$y = 65$ **Simplify.**

EXERCISES

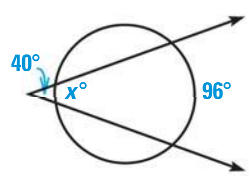
EXAMPLES 2 and 3 on pp. 681–682 for Exs. 20–22

Find the value of *x*.

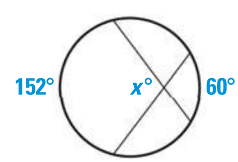
20.



21.



22.



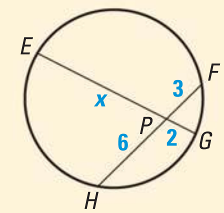
10.6 Find Segment Lengths in Circles

pp. 689–695

EXAMPLE

Find the value of x.

The chords $\overline{EG}$ and $\overline{FH}$ intersect inside the circle, so you can use Theorem 10.14 to find the value of x.



$EP \cdot PG = FP \cdot PH$ **Use Theorem 10.14.**

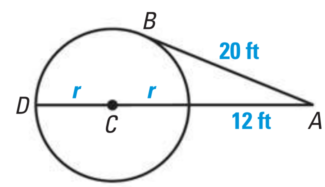
$x \cdot 2 = 3 \cdot 6$ **Substitute.**

$x = 9$ **Solve for x.**

EXERCISE

EXAMPLE 4 on p. 692 for Ex. 23

23. SKATING RINK A local park has a circular ice skating rink. You are standing at point A, about 12 feet from the edge of the rink. The distance from you to a point of tangency on the rink is about 20 feet. Estimate the radius of the rink.

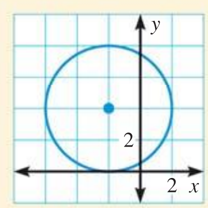


10.7 Write and Graph Equations of Circles

pp. 699–705

EXAMPLE

Write an equation of the circle shown.



The radius is 2 and the center is at $(-2, 4)$.

$(x - h)^2 + (y - k)^2 = r^2$ **Standard equation of a circle**

$(x - (-2))^2 + (y - 4)^2 = 4^2$ **Substitute.**

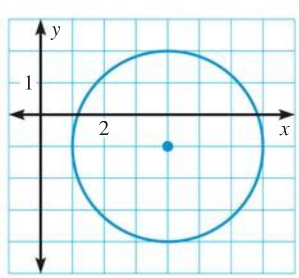
$(x + 2)^2 + (y - 4)^2 = 16$ **Simplify.**

EXERCISES

EXAMPLES 1, 2, and 3 on pp. 699–700 for Exs. 24–32

Write an equation of the circle shown.

24.



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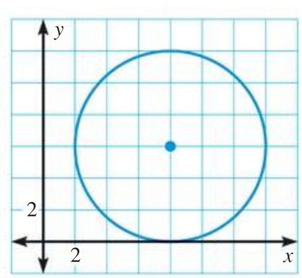
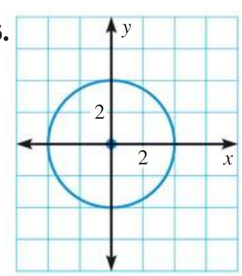


26.



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

27. Center $(0, 0)$, radius 9

28. Center $(-5, 2)$, radius 1.3

29. Center $(6, 21)$, radius 4

30. Center $(-3, 2)$, radius 16

31. Center $(10, 7)$, radius 3.5

32. Center $(0, 0)$, radius 5.2