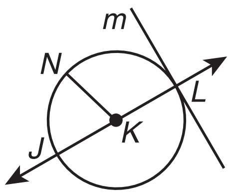
CHAPTER 11-1

Chapter Review

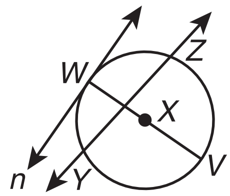
11-1 Lines that Intersect Circles

Identify each line or segment that intersects each circle.

1.



2.



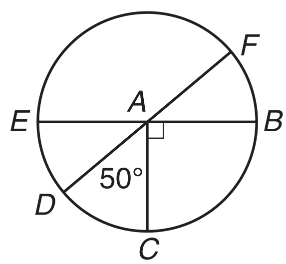
3. The summit of Mt. McKinley in Alaska is about 20,321 feet above sea level. What is the distance from the summit to the horizon, to the nearest mile?
(Hint: 5280 ft = 1 mile, radius of the Earth = 4000 miles)

11-2 Arcs and Chords

Find each measurement.

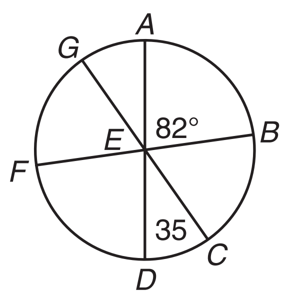
4. $\overset{\frown}{FB}$

5. $\overset{\frown}{BEC}$



6. $\overset{\frown}{FG}$

7. $\overset{\frown}{FCA}$



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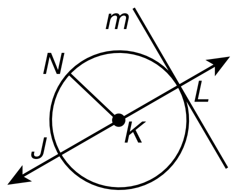
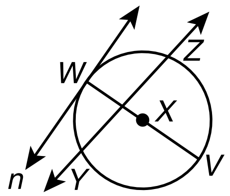


radii: $\overline{KN}$, $\overline{KJ}$, $\overline{KL}$
tangent: m
chords: $\overline{JL}$
secant: $\overline{JK}$
diameter: $\overline{JL}$

2.



radii: $\overline{XV}$, $\overline{XW}$
tangent: n
chords: $\overline{ZY}$, $\overline{WV}$
secant: $\overline{YZ}$
diameter: $\overline{WV}$

3. The summit of Mt. McKinley in Alaska is about 20,321 feet above sea level. What is the distance from the summit to the horizon, to the nearest mile?
(Hint: 5280 ft = 1 mile, radius of the Earth = 4000 miles)

175.54 miles

11-2 Arcs and Chords

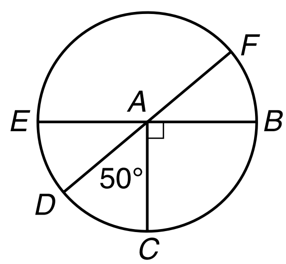
Find each measurement.

4. $\overset{\frown}{FB}$

40°

5. $\overset{\frown}{BEC}$

270°

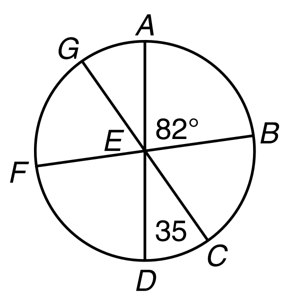


6. $\overset{\frown}{FG}$

63°

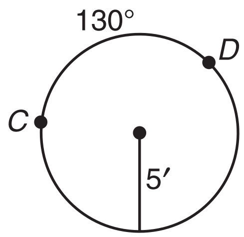
7. $\overset{\frown}{FCA}$

262°

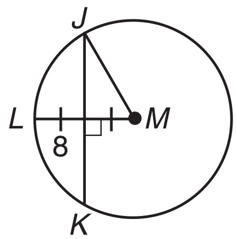


Find each length to the nearest tenth.

8. *AC*



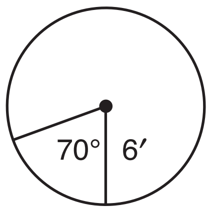
9. *JK*



11-3 Sector Area and Arc Length

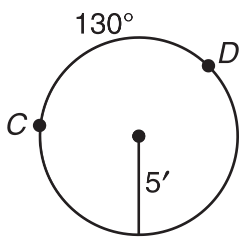
Find the shaded area. Round to the nearest tenth, if necessary.

10. As part of a parks beautification committee Kelly is designing a circular flower garden. She plans to divide the flower garden into sectors and plant different colored flowers in each sector. What is the area of each sector to the nearest square foot?



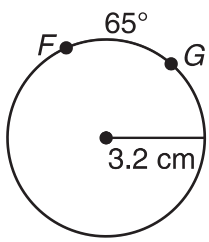
Find each arc length. Give your answer in terms of π and rounded to the nearest hundredth.

11. $\overset{\frown}{CD}$



12. $\overset{\frown}{FG}$

0



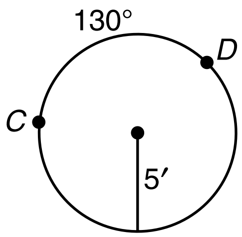
13. an arc with measure 54° in a circle with diameter 14 in.

14. a semicircle in a circle with diameter 112 m

Find each length to the nearest tenth.

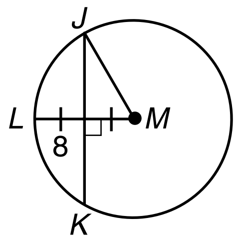
8. *AC*

16



9. *JK*

13.9



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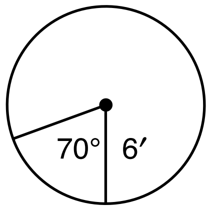
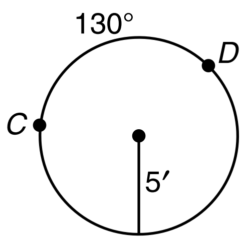


22 ft^2

Find each arc length. Give your answer in terms of π and rounded to the nearest hundredth.

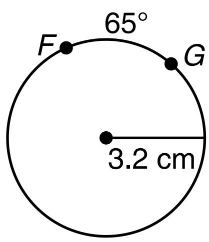
11. $\overset{\frown}{CD}$

3.61π



12. $\overset{\frown}{FG}$

1.16π 0



13. an arc with measure 54° in a circle with diameter 14 in.

2.1π

14. a semicircle in a circle with diameter 112 m

56π

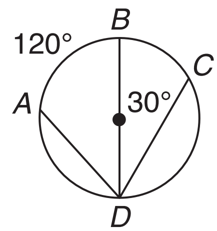
11-4 Inscribed Angles

Find each measure.

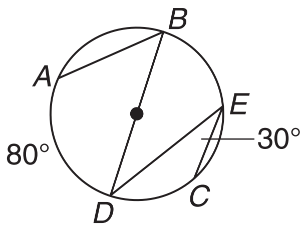
15. m$\angle ADB$

16. m$\overset{\frown}{CB}$

For Problems 15 and 16.



For Problems 17 and 18.



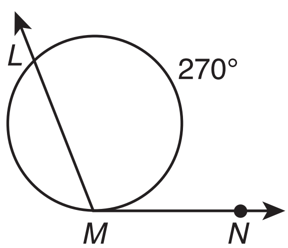
17. m$\angle ABD$

18. m$\overset{\frown}{DC}$

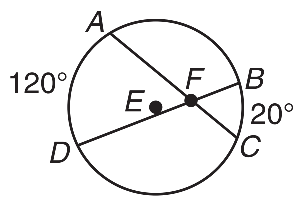
11-5 Angle Relationships in Circles

Find each measure.

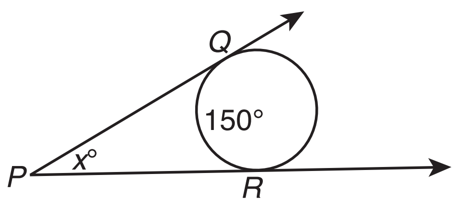
19. $m\angle LMN$



20. m$\angle AFD$



21. Find the measure of angle x.



11-4 Inscribed Angles

Find each measure.

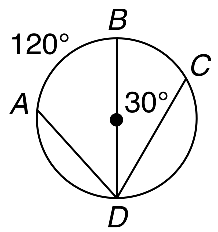
15. m$\angle ADB$

60°

16. m$\overset{\frown}{CB}$

60°

For Problems 15 and 16.



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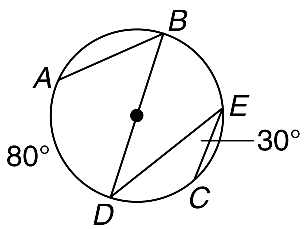


17. m$\angle ABD$

40°

18. m$\overset{\frown}{DC}$

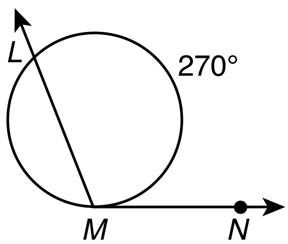
60°

11-5 Angle Relationships in Circles

Find each measure.

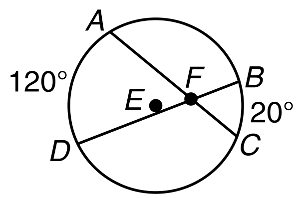
19. $m\angle LMN$

135°



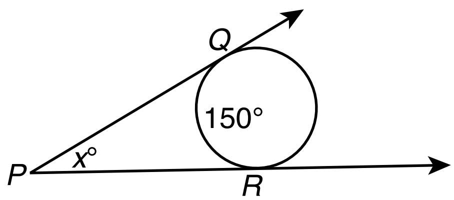
20. m$\angle AFD$

70°



21. Find the measure of angle x.

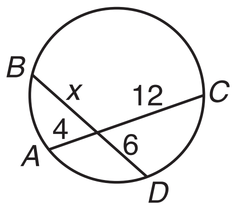
30°



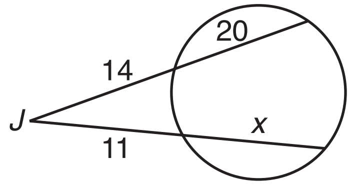
11-6 Segment Relationships in Circles

Find the value of the variable and the length of each chord or secant segment.

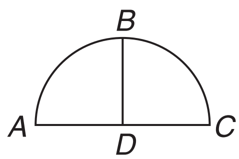
22.



23.



24. A section of an arched bridge is based on an arc of a circle as shown. $\overline{BD}$ is the perpendicular bisector of $\overline{AC}$. $AC = 60$ ft, and $BD = 20$ ft. What is the diameter of the circle?



11-7 Circles in the Coordinate Plane

Write the equation of each circle.

25. $\odot B$ with center $A(3, -4)$ and radius 5

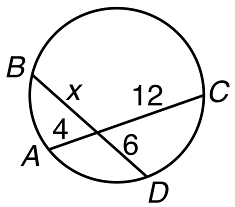
26. $\odot B$ that passes through $(-4, 12)$ has center $B(-12, 6)$

27. A local technology company is planning the location of a new cell phone tower to help with coverage in three cities. To optimize cell phone coverage, the tower should be equidistant from the three cities which are located on a coordinate plane at $A(4, 10)$, $B(6, -4)$, and $C(-10, -4)$. What are the coordinates where the tower should be built?

11-6 Segment Relationships in Circles

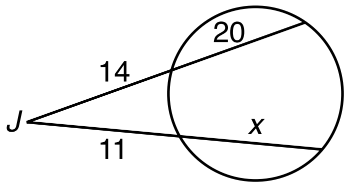
Find the value of the variable and the length of each chord or secant segment.

22.



$x = 8$, $BD = 14$, $AC = 16$

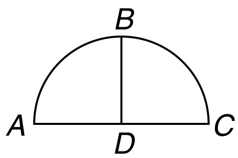
23.



$x = 32.2$, 43.2; 34

24. A section of an arched bridge is based on an arc of a circle as shown. $\overline{BD}$ is the perpendicular bisector of $\overline{AC}$. $AC = 60$ ft, and $BD = 20$ ft. What is the diameter of the circle?

65 ft



11-7 Circles in the Coordinate Plane

Write the equation of each circle.

25. $\odot B$ with center $A(3, -4)$ and radius 5

$(x - 3)^2 + (y + 4)^2 = 5^2$

26. $\odot B$ that passes through $(-4, 12)$ has center $B(-12, 6)$

$(x + 12)^2 + (y - 6)^2 = 10^2$

27. A local technology company is planning the location of a new cell phone tower to help with coverage in three cities. To optimize cell phone coverage, the tower should be equidistant from the three cities which are located on a coordinate plane at $A(4, 10)$, $B(6, -4)$, and $C(-10, -4)$. What are the coordinates where the tower should be built?

$(-2, 2)$

CHAPTER 11

Postulates and Theorems

Theorem 11-1-1 If a line is tangent to a circle, then it is perpendicular to the radius drawn to the point of tangency. (line tangent to $\odot \rightarrow$ line $\perp$ to radius)

Theorem 11-1-2 If a line is perpendicular to a radius of a circle at a point on the circle, then the line is tangent to the circle. (line $\perp$ to radius $\rightarrow$ line tangent to $\odot$)

Theorem 11-1-3 If two segments are tangent to a circle, from the same external point, then the segments are congruent. (2 segs. tangent to $\odot$ from same ext. pt. $\rightarrow$ segs $\cong$)

Postulate 11-2-1 (Arc Addition Postulate) The measure of an arc formed by two adjacent arcs is the sum of the measure of the two arcs.

Theorem 11-2-2 In a circle or congruent circles: (1) Congruent central angles have congruent chords. (2) Congruent chords have congruent arcs. (3) Congruent arcs have congruent central angles.

Theorem 11-2-3 In a circle, if a radius (or diameter) is perpendicular to a chord, then it bisects the chord and its arc.

Theorem 11-2-4 In a circle, the perpendicular bisector of a chord is a radius (or a diameter).

Theorem 11-4-1 The measure of an inscribed angle is half the measure of its intercepted arc.

Corollary 11-4-2 If inscribed angles of a circle intercept the same arc or are subtended by the same chord or arc, then the angles are congruent.

Theorem 11-4-3 An inscribed angle subtends a semicircle if and only if the angle is a right angle.

Theorem 11-4-4 If a quadrilateral is inscribed in a circle, then its opposite angles are supplementary.

Theorem 11-5-1 If a tangent and a secant (or chord) intersect on a circle at the point of tangency, then the measure of the angle formed is half the measure of its intercepted arc.

Theorem 11-5-2 If two secants or chords intersect in the interior of a circle, then the measure of each angle formed is half the sum of the measures of its intercepted arcs.

Postulates and Theorems

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Theorem 11-5-2 If two secants or chords intersect in the interior of a circle, then the measure of each angle formed is half the sum of the measures of its intercepted arcs.

Theorem 11-5-3 If a tangent and a secant, two tangents, or two secants intersect in the exterior of a circle, then the measure of the angle formed is half the difference of the measures of its intercepted arcs.

Theorem 11-6-1 (Chord-Chord Product Theorem) If two chords intersect in the interior of a circle, then the products of the lengths of the segments of the chords are equal.

Theorem 11-6-2 (Secant-Secant Product Theorem) If two secants intersect in the exterior of a circle, then the product of the lengths of one secant segment and its external segment equals the product of the lengths of the other secant segment and its external segment. (whole · outside = whole · outside)

Theorem 11-6-3 (Secant-Tangent Product Theorem) If a secant and a tangent intersect in the exterior of a circle, then the product of the lengths of the secant segment and its external segment equals the length of the tangent segment squared. (whole · outside = tangent^2)

Theorem 11-7-1 (Equation of a Circle) The equation of a circle with center (h, k) and radius r is $(x - h)^2 + (y - k)^2 = r^2$.

Theorem 11-5-3 If a tangent and a secant, two tangents, or two secants intersect in the exterior of a circle, then the measure of the angle formed is half the difference of the measures of its intercepted arcs.

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