



Parts of a Circle

Goal

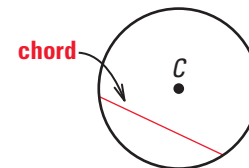
Identify segments and lines related to circles.

Key Words

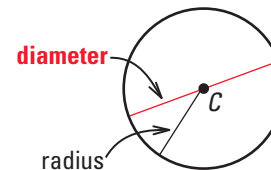
- chord
- diameter p. 452
- radius p. 452
- secant
- tangent
- point of tangency

The diagrams below show special segments and lines of a circle.

A **chord** is a segment whose endpoints are points on a circle.

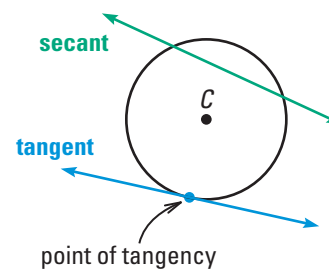


A **diameter** is a chord that passes through the center of a circle.



A **radius** is a segment whose endpoints are the center of a circle and a point on the circle.

A **secant** is a line that intersects a circle in two points.



A **tangent** is a line in the plane of a circle that intersects the circle in exactly one point. The point is called a **point of tangency**.

Student Help

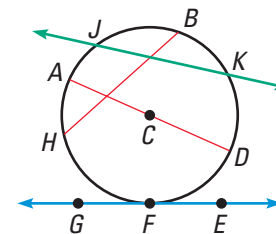
STUDY TIP

To identify a circle, you can name the point that is the center of the circle. In Example 1, C is the center, so the circle is called $\odot C$.

EXAMPLE 1 Identify Special Segments and Lines

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

- | | |
|------------------------------|------------------------------|
| a. \overline{AD} | b. \overline{HB} |
| c. \overleftrightarrow{EG} | d. \overleftrightarrow{JK} |



Solution

- \overline{AD} is a diameter because it passes through the center C and its endpoints are points on the circle.
- \overline{HB} is a chord because its endpoints are on the circle.
- \overleftrightarrow{EG} is a tangent because it intersects the circle in exactly one point.
- \overleftrightarrow{JK} is a secant because it intersects the circle in two points.

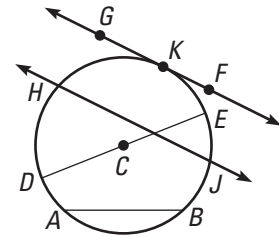
Student Help

VOCABULARY TIP

The plural of *radius* is *radii*.

EXAMPLE 2 Name Special Segments, Lines, and Points

Identify a chord, a secant, a tangent, a diameter, two radii, the center, and a point of tangency.

**Solution**

\overline{AB} is a chord.

\overleftrightarrow{HJ} is a secant.

\overleftrightarrow{FG} is a tangent.

\overline{DE} is a diameter.

\overline{DC} is a radius.

\overline{CE} is a radius.

C is the center.

K is a point of tangency.

Student Help
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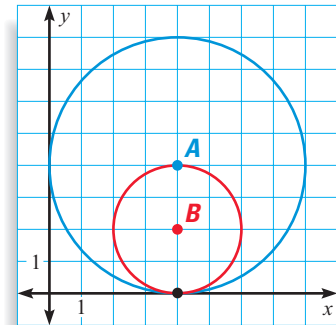
MORE EXAMPLES

More examples at
classzone.com

EXAMPLE 3 Circles in Coordinate Geometry

When a circle lies in a coordinate plane, you can use coordinates to describe particular points of the circle.

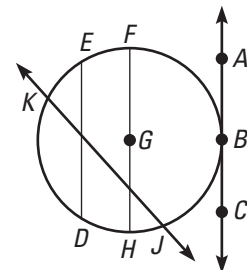
- Name the coordinates of the center of each circle.
- Name the coordinates of the intersection of the two circles.
- What is the line that is tangent to both circles? Name the coordinates of the point of tangency.
- What is the length of the diameter of $\odot B$?
What is the length of the radius of $\odot A$?

**Solution**

- The center of $\odot A$ is $A(4, 4)$. The center of $\odot B$ is $B(4, 2)$.
- The intersection of the two circles is the point $(4, 0)$.
- The x -axis is tangent to both circles. The point of tangency is $(4, 0)$.
- The diameter of $\odot B$ is 4. The radius of $\odot A$ is 4.

Checkpoint Parts of a Circle

- Identify a chord, a secant, a tangent, a diameter, a radius, the center, and a point of tangency.
- In Example 3, name the coordinates of the point of tangency of the y -axis to $\odot A$.



11.1 Exercises

Guided Practice

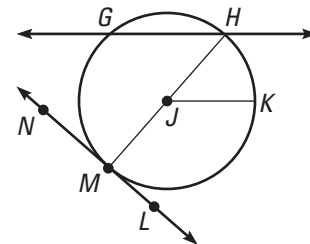
Vocabulary Check

1. Sketch a circle. Then sketch and label a *radius*, a *diameter*, a *chord*, and a *tangent*.

Skill Check

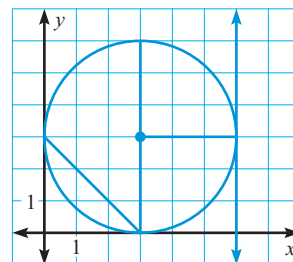
Match the part of the circle with the term that best describes it.

- | | |
|------------------------------|----------------------|
| 2. \overline{GH} | A. Center |
| 3. M | B. Chord |
| 4. \overline{JM} | C. Diameter |
| 5. J | D. Radius |
| 6. \overline{MH} | E. Point of tangency |
| 7. \overleftrightarrow{GH} | F. Secant |



Use the circle to name the coordinates of the points.

- center
- endpoints of a diameter
- a point of tangency
- endpoints of a chord that is not a diameter
- endpoints of a radius



Practice and Applications

Extra Practice

See p. 695.

Finding Radii The diameter of a circle is given. Find the radius.

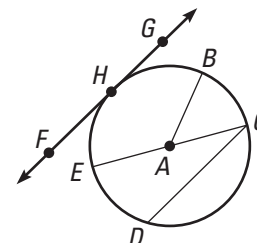
13. $d = 15$ cm 14. $d = 6.5$ in. 15. $d = 3$ ft 16. $d = 8$ m

Finding Diameters The radius of a circle is given. Find the diameter.

17. $r = 26$ in. 18. $r = 62$ ft 19. $r = 8.7$ m 20. $r = 4.4$ cm

Identifying Terms Name the term that best describes the given line, segment, or point.

- | | |
|---------------------|-------------------------------|
| 21. \overline{CD} | 22. \overleftrightarrow{FG} |
| 23. \overline{EC} | 24. \overline{AB} |
| 25. H | 26. A |



Homework Help

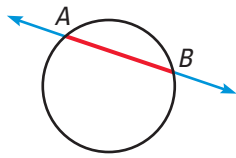
Example 1: Exs. 21–32

Example 2: Exs. 33–39

Example 3: Exs. 40–47

Visualize It!

A **chord** is a segment.
A **secant** is a line.



\overline{AB} is a **chord**.
 \overleftrightarrow{AB} is a **secant**.

Identifying Terms Tell whether the line or segment is best described as a *chord*, a *secant*, a *tangent*, a *diameter*, or a *radius*.

27. \overline{PZ}

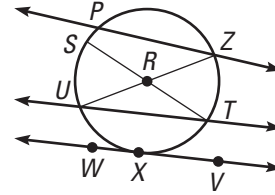
28. \overline{RT}

29. \overleftrightarrow{ST}

30. \overleftrightarrow{PZ}

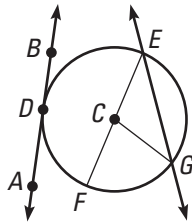
31. \overleftrightarrow{VW}

32. \overleftrightarrow{TU}

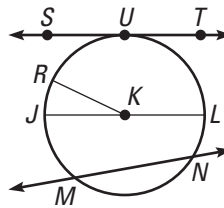


Identifying Terms Identify a chord, a secant, a diameter, a radius, and a point of tangency.

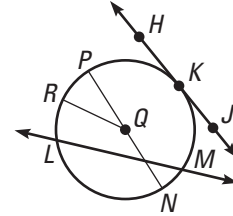
33.



34.



35.

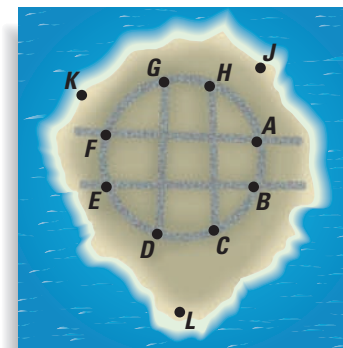


Link to Geography



MEXCALTITÁN is a tiny island located on the west coast of Mexico. Its settlement follows the circular shape of the island.

Island Map The diagram shows the layout of the streets on Mexcaltitán Island.



36. Name two secants.

37. Name two chords.

38. Is the diameter of the circle longer than \overline{HC} ? Explain.

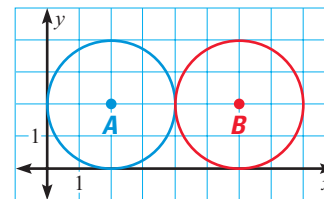
39. Can you draw a line through three of the given points that is tangent to the circle?

Coordinate Geometry Use the diagram below.

40. What are the coordinates of the center of $\odot A$? of $\odot B$?

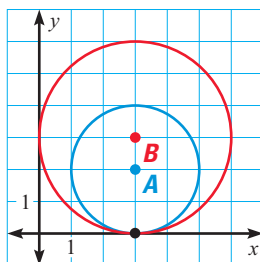
41. What is the length of the radius of $\odot A$? of $\odot B$?

42. Name the coordinates of the intersection of the two circles.

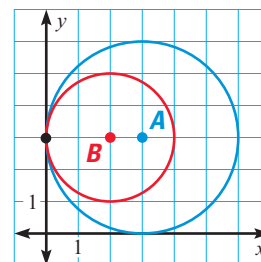


Coordinate Geometry Name the coordinates of the center of each circle, identify the point of intersection of the circles, and identify a line that is tangent to both circles.

43.

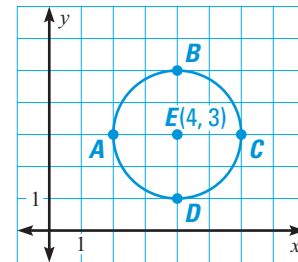


44.



Coordinate Geometry Use the diagram below.

- 45. What are the lengths of the radius and the diameter of the circle?
- 46. Find the length of the chord \overline{AB} .
- 47. Copy the diagram and sketch a tangent that passes through A.



Standardized Test Practice

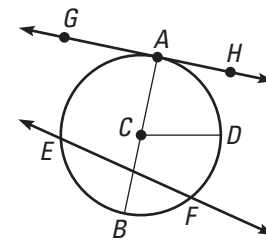
In Exercises 48 and 49, use the diagram below.

- 48. **Multiple Choice** Which of the following is a secant?

- (A) \overleftrightarrow{EF}
- (B) \overleftrightarrow{GH}
- (C) \overline{AB}
- (D) \overleftrightarrow{EF}

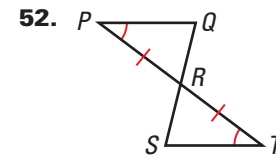
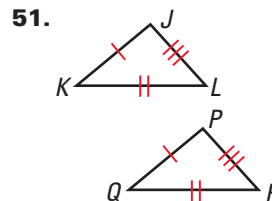
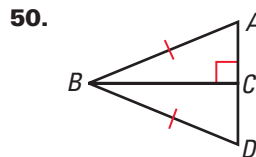
- 49. **Multiple Choice** Which of the following is a tangent?

- (F) \overleftrightarrow{EF}
- (G) \overleftrightarrow{GH}
- (H) \overline{AB}
- (J) \overline{AC}



Mixed Review

Congruent Triangles Tell which theorem or postulate you can use to show that the triangles are congruent. Explain your reasoning. (Lessons 5.2, 5.4)



Coordinate Geometry Plot the points and draw the quadrilateral. Use the slopes of the segments to determine whether the quadrilateral is a parallelogram. (Lesson 6.3)

- 53. $A(0, 0), B(1, 3), C(5, 3), D(4, 0)$
- 54. $P(2, 1), Q(0, 5), R(2, 5), S(4, 1)$

Algebra Skills

Simplifying Radicals Find the square root. Round your answer to the nearest tenth. (Lesson 10.1)

- 55. $\sqrt{32}$
- 56. $\sqrt{81}$
- 57. $\sqrt{40}$
- 58. $\sqrt{104}$
- 59. $\sqrt{98}$
- 60. $\sqrt{192}$
- 61. $\sqrt{250}$
- 62. $\sqrt{242}$

Solving Equations Solve the equation. (Skills Review, p. 673)

- 63. $2x + 5 = 19$
- 64. $7x - 7 = 14$
- 65. $5x + 9 = 4$
- 66. $3x - 10 = 20$
- 67. $12 - 8x = 84$
- 68. $4x + 3 = 23$