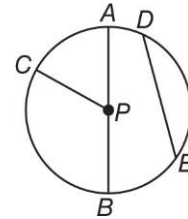


9-1 Skills Practice

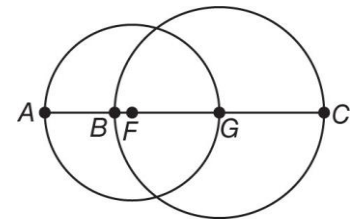
Circles and Circumference

For Exercises 1-7, refer to the circle shown at right.



1. Name the circle.
2. Name a radius.
3. Name a chord.
4. Name a diameter.
5. Name a radius not drawn as part of a diameter.
6. Suppose the diameter of the circle is 16 centimeters. Find the radius.
7. If $PC = 11$ inches, find AB .

The diameters of $\odot F$ and $\odot G$ are 5 and 6 units, respectively. Find each measure.

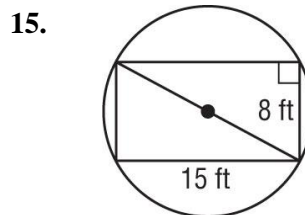
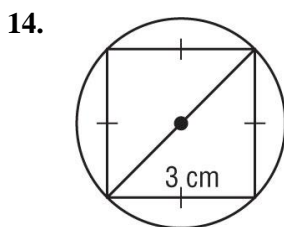


8. BF
9. AB

Find the diameter and radius of a circle with the given circumference. Round to the nearest hundredth.

10. $C = 36$ m
11. $C = 17.2$ ft
12. $C = 81.3$ cm
13. $C = 5$ yd

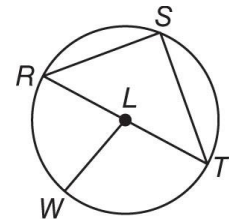
Find the exact circumference of each circle.



9-1 Practice

Circles and Circumference

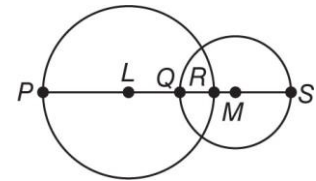
For Exercises 1–7, refer to the circle shown at right.



1. Name the circle.
2. Name a radius.
3. Name a chord.
4. Name a diameter.
5. Name a radius not drawn as part of a diameter.
6. Suppose the radius of the circle is 3.5 yards. Find the diameter.
7. If $RT = 19$ meters, find LW .

The diameters of $\odot L$ and $\odot M$ are 20 and 13 units, respectively, and $QR = 4$. Find each measure.

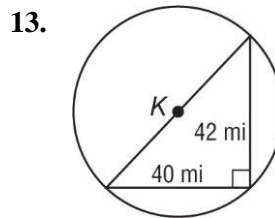
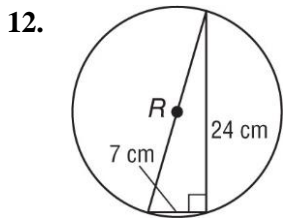
8. LQ
9. RM



Find the diameter and radius of a circle with the given circumference. Round to the nearest hundredth.

10. $C = 21.2$ ft
11. $C = 5.9$ m

Find the exact circumference of each circle using the given inscribed polygon.



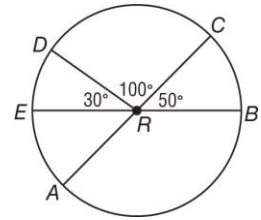
14. **SUNDIALS** Herman purchased a sundial to use as the centerpiece for a garden. The diameter of the sundial is 9.5 inches.

- a. Find the radius of the sundial.
- b. Find the circumference of the sundial to the nearest hundredth.

9-2 Skills Practice

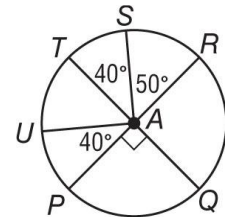
Measuring Angles and Arcs

\overline{AC} and \overline{EB} are diameters of $\odot R$. Identify each arc as a *major arc*, *minor arc*, or *semicircle* of the circle. Then find its measure.



- | | |
|--------------------|---------------------|
| 1. $m\widehat{EA}$ | 2. $m\widehat{CB}$ |
| 3. $m\widehat{DC}$ | 4. $m\widehat{DEB}$ |
| 5. $m\widehat{AB}$ | 6. $m\widehat{CDA}$ |

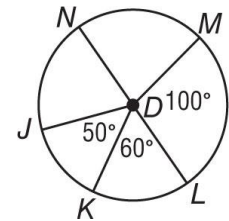
\overline{PR} and \overline{QT} are diameters of $\odot A$. Find each measure.



- | | |
|----------------------|----------------------|
| 7. $m\widehat{UPQ}$ | 8. $m\widehat{PQR}$ |
| 9. $m\widehat{UTS}$ | 10. $m\widehat{RS}$ |
| 11. $m\widehat{RSU}$ | 12. $m\widehat{STP}$ |
| 13. $m\widehat{PQS}$ | 14. $m\widehat{PRU}$ |

Use $\odot D$ to find the length of each arc. Round to the nearest hundredth.

- | | |
|----------------------------------------------|-----------------------------------------------|
| 15. \widehat{LM} if the radius is 5 inches | 16. \widehat{MN} if the diameter is 3 yards |
| 17. \widehat{KL} if $JD = 7$ centimeters | 18. \widehat{NJK} if $NL = 12$ feet |
| 19. \widehat{KLM} if $DM = 9$ millimeters | 20. \widehat{JK} if $KD = 15$ inches |

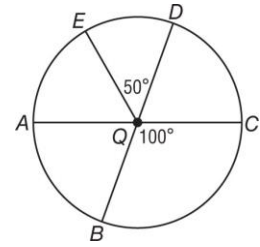


9-2 Practice

Measuring Angles and Arcs

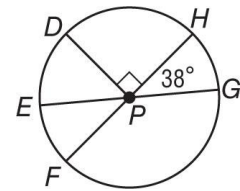
\overline{AC} and \overline{DB} are diameters of $\odot Q$. Identify each arc as a *major arc*, *minor arc*, or *semicircle* of the circle. Then find its measure.

1. $m\widehat{AE}$
2. $m\widehat{AB}$
3. $m\widehat{EDC}$
4. $m\widehat{ADC}$
5. $m\widehat{ABC}$
6. $m\widehat{BC}$



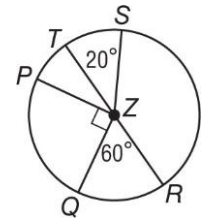
\overline{FH} and \overline{EG} are diameters of $\odot P$. Find each measure.

7. $m\widehat{EF}$
8. $m\widehat{DE}$
9. $m\widehat{FG}$
10. $m\widehat{DHG}$
11. $m\widehat{DFG}$
12. $m\widehat{DGE}$



Use $\odot Z$ to find each arc length. Round to the nearest hundredth.

13. \widehat{QPT} , if $QZ = 10$ inches
14. \widehat{QR} , if $PZ = 12$ feet
15. \widehat{PQR} , if $TR = 15$ meters
16. \widehat{QPS} , if $ZQ = 7$ centimeters



17. HOMEWORK Refer to the table, which shows the number of hours students at Leland High School say they spend on homework each night.

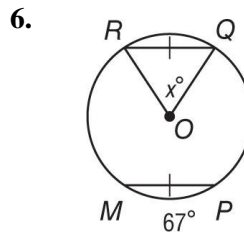
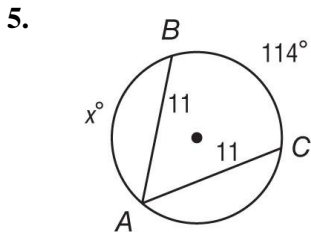
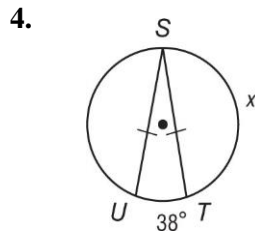
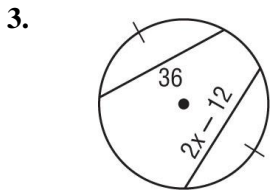
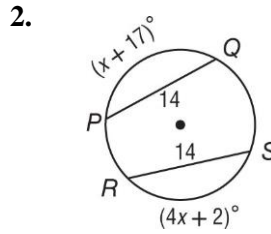
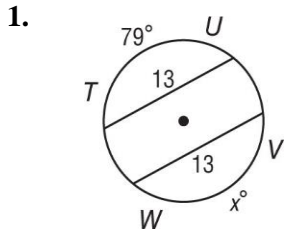
- a. If you were to construct a circle graph of the data, how many degrees would be allotted to each category?
- b. Describe the arcs associated with each category.

Homework	
Less than 1 hour	8%
1–2 hours	29%
2–3 hours	58%
3–4 hours	3%
Over 4 hours	2%

9-3 Skills Practice

Arcs and Chords

ALGEBRA Find the value of x in each circle.



In $\odot Y$ the radius is 34, $AB = 60$, and $m\widehat{AC} = 71$. Find each measure.

7. $m\widehat{BC}$

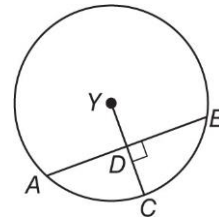
8. $m\widehat{AB}$

9. AD

10. BD

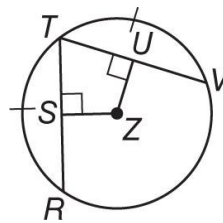
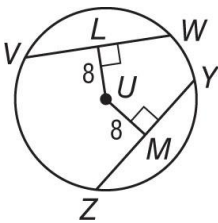
11. YD

12. DC



13. In $\odot U$, $VW = 20$ and $YZ = 5x$. What is x ?

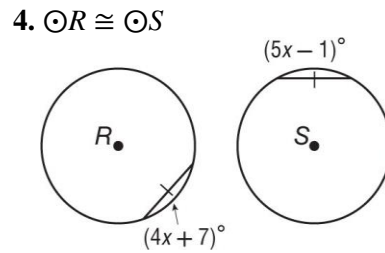
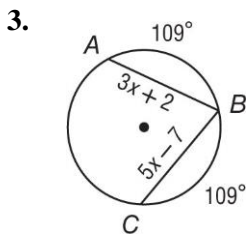
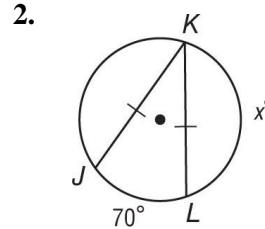
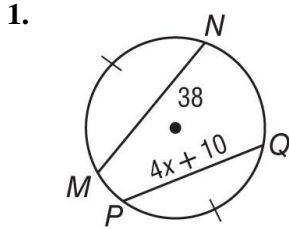
14. In $\odot Z$, $\widehat{TR} \cong \widehat{TV}$, $SZ = x + 4$, and $UZ = 2x - 1$. What is x ?



9-3 Practice

Arcs and Chords

ALGEBRA Find the value of x in each circle.



The radius of $\odot N$ is 18, $NK = 9$, and $m\widehat{DE} = 120$. Find each measure.

5. $m\widehat{GE}$

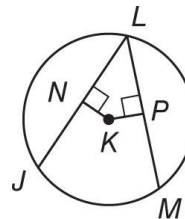
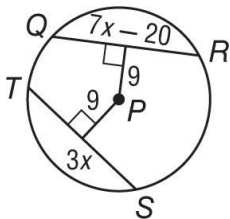
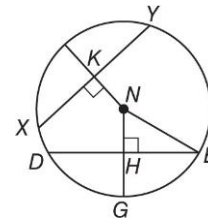
6. $m\angle HNE$

7. $m\angle HEN$

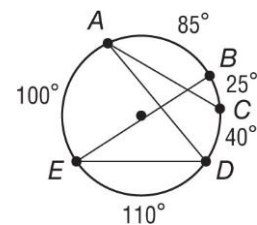
8. HN

9. In $\odot P$, $QR = 7x - 20$ and $TS = 3x$. What is x ?

10. In $\odot K$, $\overline{JL} \cong \overline{LM}$, $KN = 3x - 2$, and $KP = 2x + 1$. What is x ?



11. GARDEN PATHS A circular garden has paths around its edge that are identified by the given arc measures. It also has four straight paths, identified by segments \overline{AC} , \overline{AD} , \overline{BE} , and \overline{DE} , that cut through the garden's interior. Which two straight paths have the same length?

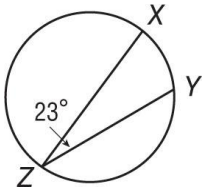


9-4 Skills Practice

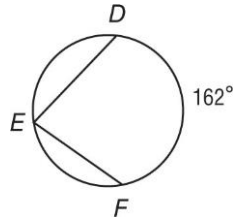
Inscribed Angles

Find each measure.

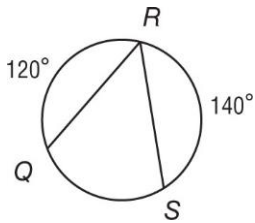
1. $m\widehat{XY}$



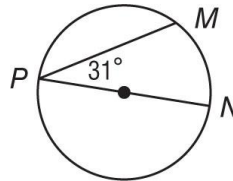
2. $m\angle E$



3. $m\angle R$

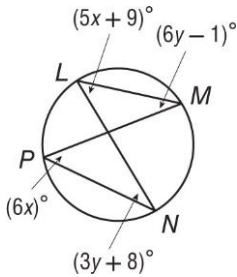


4. $m\widehat{MP}$

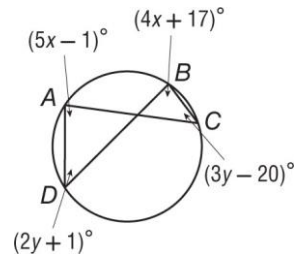


ALGEBRA Find each measure.

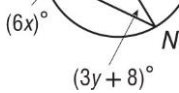
5. $m\angle N$



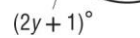
7. $m\angle C$



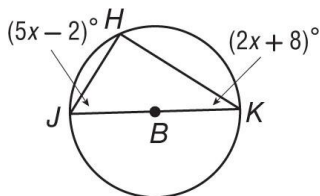
6. $m\angle L$



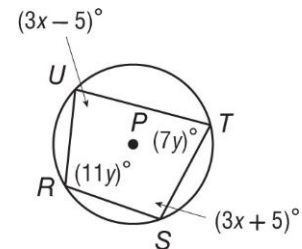
8. $m\angle A$



9. $m\angle J$



11. $m\angle S$



10. $m\angle K$

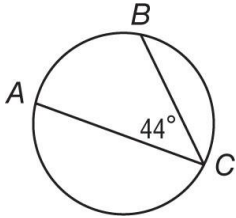
12. $m\angle R$

9-4 Practice

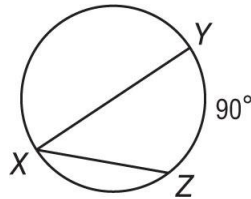
Inscribed Angles

Find each measure.

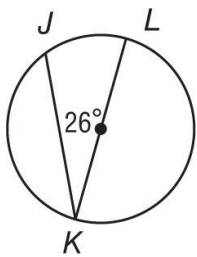
1. $m\widehat{AB}$



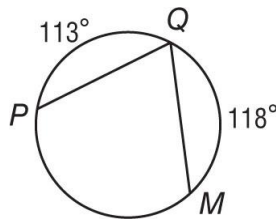
2. $m\angle X$



3. $m\widehat{JK}$

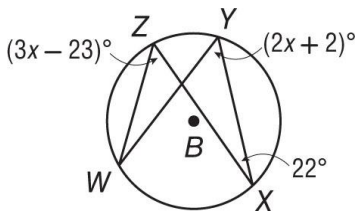


4. $m\angle Q$

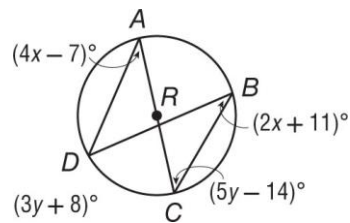


ALGEBRA Find each measure.

5. $m\angle W$



7. $m\angle A$

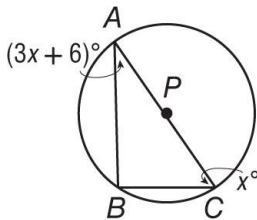


6. $m\angle Y$

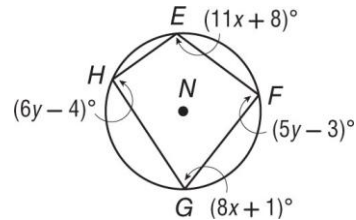
8. $m\angle D$

ALGEBRA Find each measure.

9. $m\angle A$



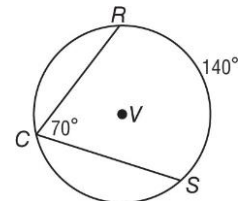
11. $m\angle G$



10. $m\angle C$

12. $m\angle H$

13. PROBABILITY On $\odot V$, point C is randomly located so that it does not coincide with points R or S . If $m\widehat{RS} = 140$, what is the probability that $m\angle RCS = 70$?

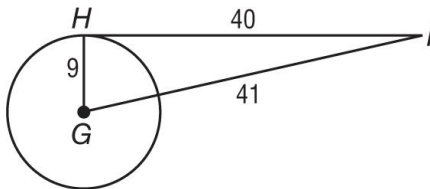


9-5 Skills Practice

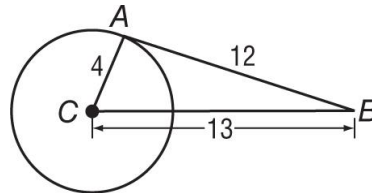
Tangents

Determine whether each segment is tangent to the given circle. Justify your answer.

1. \overline{HI}

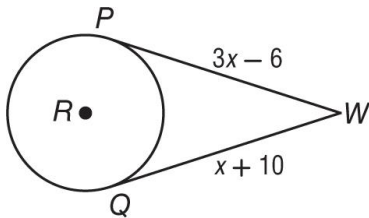


2. \overline{AB}

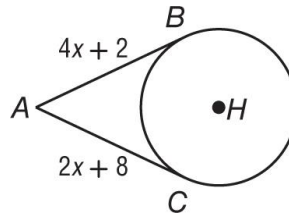


Find x . Assume that segments that appear to be tangent are tangent. Round to the nearest tenth if necessary.

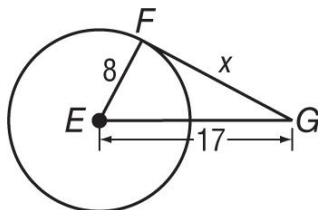
3.



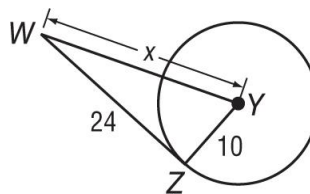
4.



5.

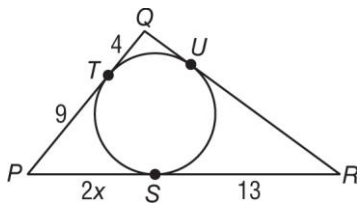


6.

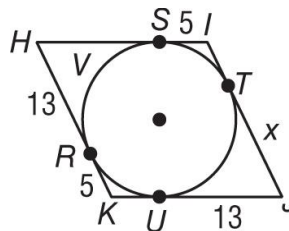


For each figure, find x . Then find the perimeter.

7.



8.

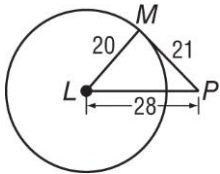


9-5 Practice

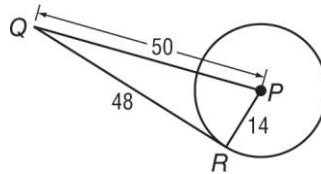
Tangents

Determine whether each segment is tangent to the given circle. Justify your answer.

1. \overline{MP}

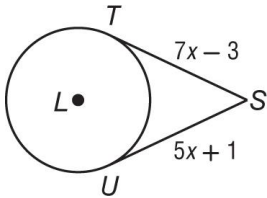


2. \overline{QR}

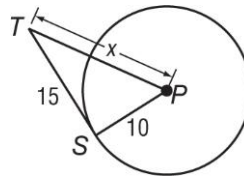


Find x . Assume that segments that appear to be tangent are tangent. Round to the nearest tenth if necessary.

3.

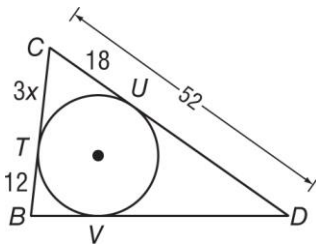


4.

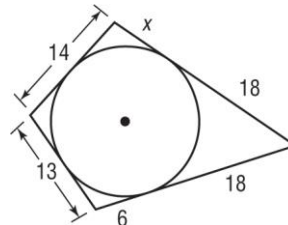


For each figure, find x . Then find the perimeter.

5.

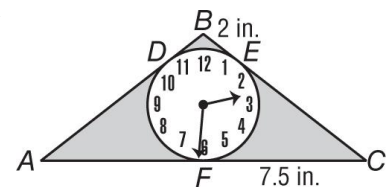


6.



7. **CLOCKS** The design shown in the figure is that of a circular clock face inscribed in a triangular base. AF and FC are equal.

- Find AB .
- Find the perimeter of the clock.

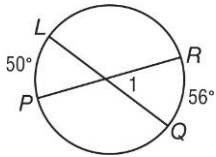


9-6 Skills Practice

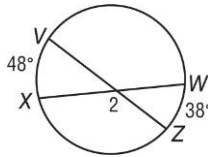
Secants, Tangents, and Angle Measures

Find each measure. Assume that segments that appear to be tangent are tangent.

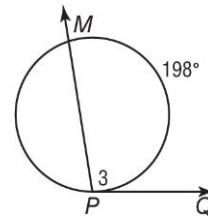
1. $m\angle 1$



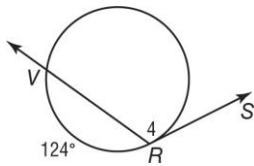
2. $m\angle 2$



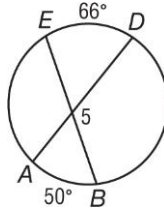
3. $m\angle 3$



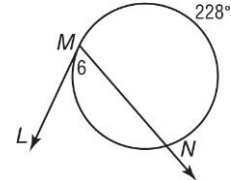
4. $m\angle 4$



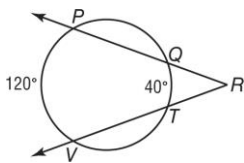
5. $m\angle 5$



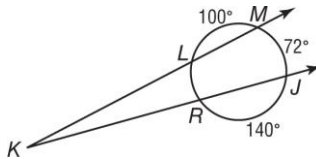
6. $m\angle 6$



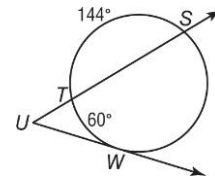
7. $m\angle R$



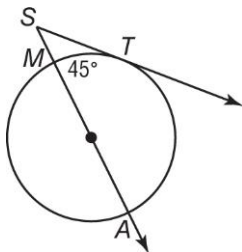
8. $m\angle K$



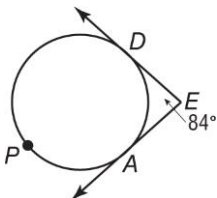
9. $m\angle U$



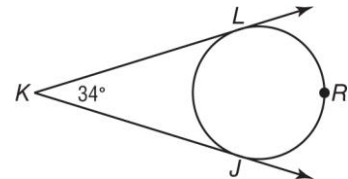
10. $m\angle S$



11. $m\widehat{DPA}$



12. $m\widehat{LJ}$

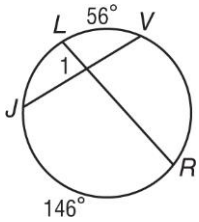


9-6 Practice

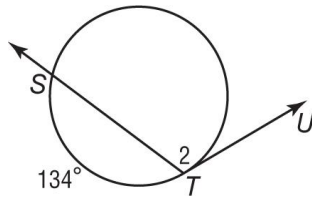
Secants, Tangents, and Angle Measures

Find each measure. Assume that any segments that appear to be tangent are tangent.

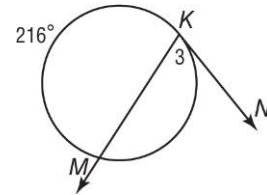
1. $m\angle 1$



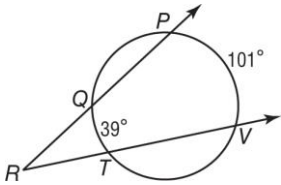
2. $m\angle 2$



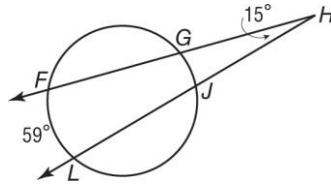
3. $m\angle 3$



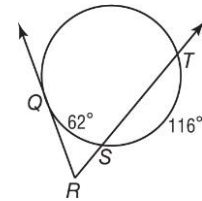
4. $m\angle R$



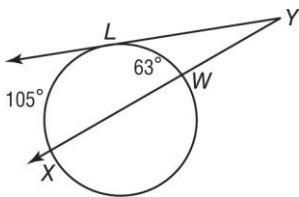
5. $m\widehat{GJ}$



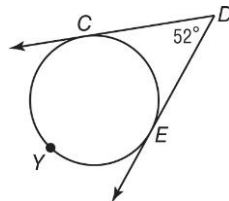
6. $m\angle R$



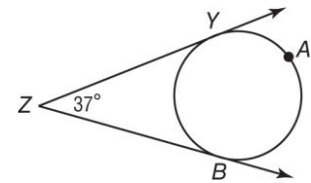
7. $m\angle Y$



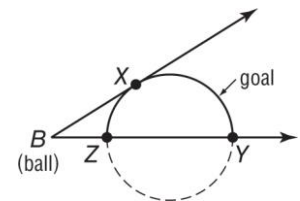
8. $m\widehat{CE}$



9. $m\widehat{YAB}$



10. RECREATION In a game of kickball, Rickie has to kick the ball through a semicircular goal to score. If $m\widehat{XZ} = 58$ and the $m\widehat{XY} = 122$, at what angle must Rickie kick the ball to score? Explain.



9-7 Skills Practice

Equations of Circles

Write the equation of each circle.

1. center at origin, radius 6

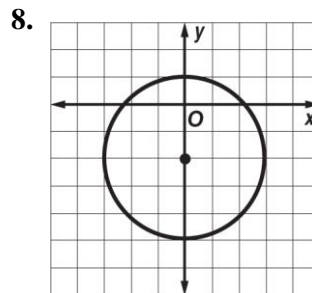
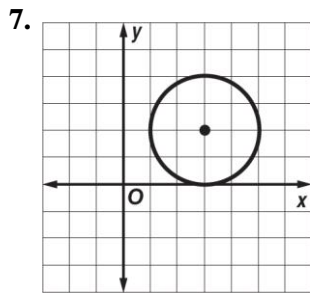
2. center at (0, 0), radius 2

3. center at (4, 3), radius 9

4. center at (7, 1), diameter 24

5. center at (-4, -1), passes through (-2, 3)

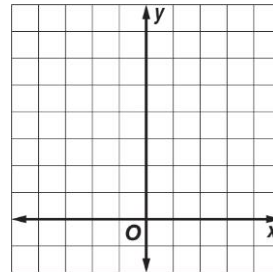
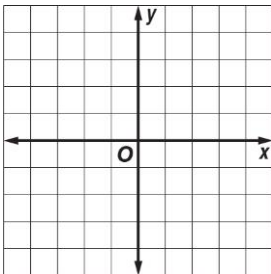
6. center at (5, -2), passes through (4, 0)



For each circle with the given equation, state the coordinates of the center and the measure of the radius. Then graph the equation.

9. $x^2 + y^2 = 16$

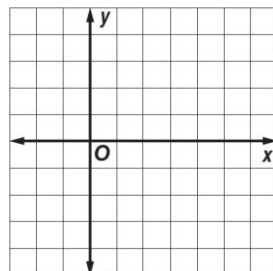
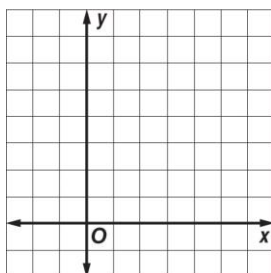
10. $(x - 1)^2 + (y - 4)^2 = 9$



Write an equation of a circle that contains each set of points. Then graph the circle.

11. $A(-2, 3), B(1, 0), C(4, 3)$

12. $F(3, 0), G(5, -2), H(1, -2)$



9-7 Practice

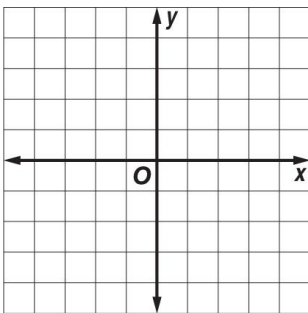
Equations of Circles

Write the equation of each circle.

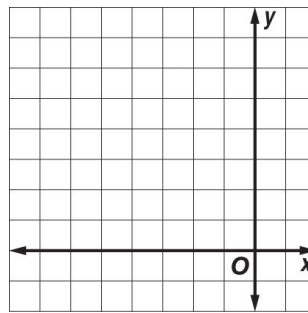
1. center at (0, 0), diameter 18
2. center at (-7, 11), radius 8
3. center at (-1, 8), passes through (9, 3)
4. center at (-3, -3), passes through (-2, 3)

For each circle with the given equation, state the coordinates of the center and the measure of the radius. Then graph the equation.

5. $x^2 + y^2 - 4 = 0$

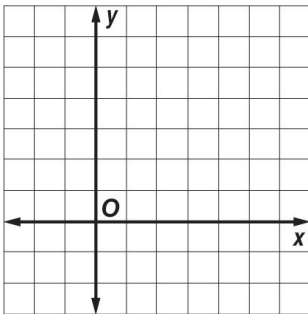


6. $x^2 + y^2 + 6x - 6y + 9 = 0$

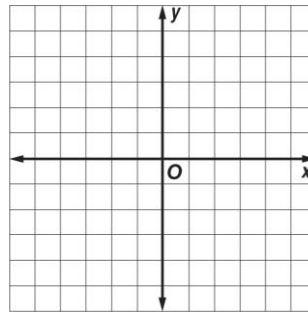


Write an equation of a circle that contains each set of points. Then graph the circle.

7. $A(-2, 2), B(2, -2), C(6, 2)$



8. $R(5, 0), S(-5, 0), T(0, -5)$



Find the point(s) of intersection, if any, between each circle and line with the equations given.

9. $x^2 + y^2 = 25; y = x$

10. $(x + 4)^2 + (y - 3)^2 = 25; y = x + 2$

- 11. EARTHQUAKES** When an earthquake strikes, it releases seismic waves that travel in concentric circles from the epicenter of the earthquake. Seismograph stations monitor seismic activity and record the intensity and duration of earthquakes. Suppose a station determines that the epicenter of an earthquake is located about 50 kilometers from the station. If the station is located at the origin, write an equation for the circle that represents one of the concentric circles of seismic waves of the earthquake.

9-8 Skills Practice

Equations of Parabolas

Write the equation of each parabola with the given conditions.

1. focus (4, 0) and directrix $x = -4$

2. vertex (2, 4) and focus (0, 4)

3. focus (0, 1) and directrix $x = 3$

4. vertex (3, -1) and focus (3, -11)

Identify the focus and directrix of each parabola.

5. $y + 3 = \frac{1}{40}(x - 1)^2$

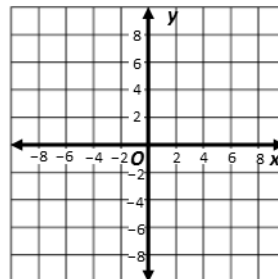
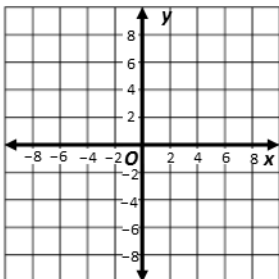
6. $y^2 = 24x$

7. $x + 2 = \frac{1}{8}(y - 4)^2$

Graph each equation.

8. $x + 2 = -\frac{1}{24}(y - 1)^2$

9. $x^2 = 12y$



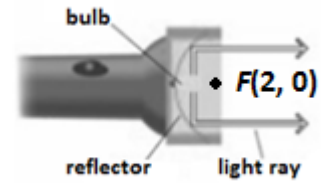
9-8 Practice

Equations of Parabolas

Write the equation of each parabola with the given conditions.

1. focus $(6, 0)$ and directrix $x = -6$ 2. vertex $(3, -2)$ and focus $(3, -4)$

3. The parabolic reflector plate of a flashlight has its bulb located at the focus of the parabola. The distance between the vertex and the focus is 2 centimeters. Write an equation of the parabola that models the cross section of the reflector plate.



Identify the focus and directrix of each parabola.

4. $y + 1 = \frac{1}{8}(x - 2)^2$ 5. $x - 1 = \frac{1}{16}(y + 3)^2$ 6. $y = \frac{1}{4}(x + 4)^2$

Graph each equation.

7. $y = -\frac{1}{8}(x - 4)^2 + 7$ 8. $x = \frac{1}{12}(y + 3)^2 - 2$

