

Skills Practice

Name _____ Date _____

Riding a Ferris Wheel Introduction to Circles

Vocabulary

Write the term from the box that best completes each statement.

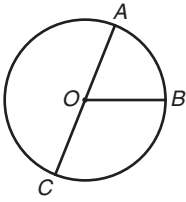
circle	diameter	point of tangency	arc	center
secant	central angle	minor arc	radius	tangent
inscribed angle	major arc	chord	semicircle	

1. The _____ is the distance from the center of a circle to a point on the circle.
2. A(n) _____ is the set of all points in a plane that are the same distance from a given point, called the center of the circle.
3. A(n) _____ is an arc whose endpoints form the endpoints of a diameter of the circle.
4. The distance across a circle through the center is the _____ of the circle.
5. A(n) _____ of a circle is an angle whose sides are radii.
6. A(n) _____ is an unbroken portion of a circle that lies between two points on the circle.
7. A(n) _____ is a segment whose endpoints are points on a circle.
8. Two points on a circle determine a major arc and a minor arc; the _____ is the arc with the greater measure.
9. A(n) _____ of a circle is a line that intersects the circle in exactly one point.
10. A(n) angle whose vertex is on a circle and whose sides contain chords of the circle is an _____.
11. A line that intersects a circle at two points is a(n) _____ of the circle.
12. The _____ is the point at which a tangent intersects a circle.
13. The _____ of a circle is a fixed point in space that is an equal distance from every point on the circle.
14. Two points on a circle determine a minor arc and a major arc; the _____ is the arc with the lesser measure.

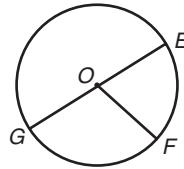
Problem Set

Identify a term to describe each part of the circle. Explain your answer.

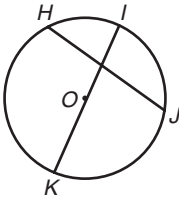
15. \overline{OA}



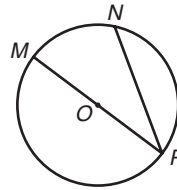
16. \overline{GE}



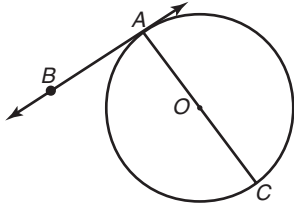
17. O



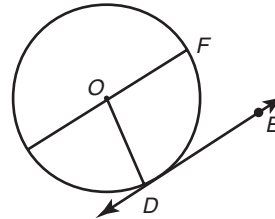
18. \overline{NP}



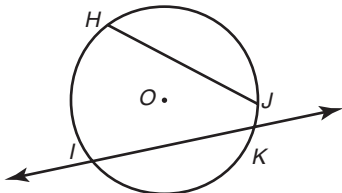
19. line \overleftrightarrow{AB}



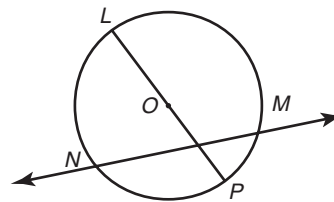
20. D



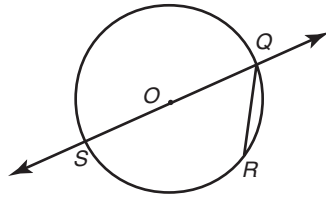
21. \overline{JH}



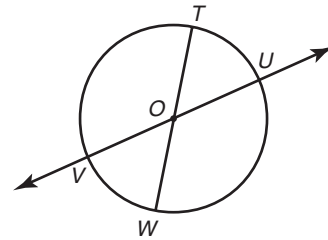
22. line \overleftrightarrow{MN}



23. $\angle SQR$

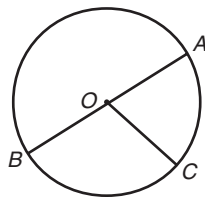


24. $\angle TOU$

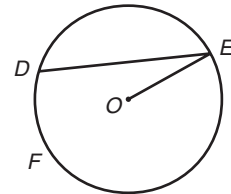


Classify each arc as a major arc, a minor arc, or a semicircle.

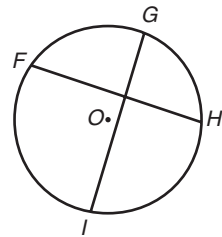
25. \widehat{AC}



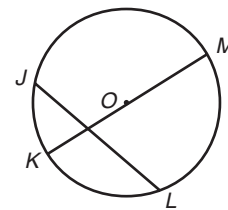
26. \widehat{DE}



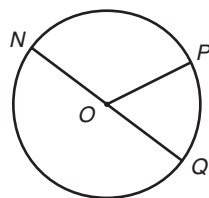
27. \widehat{FHI}



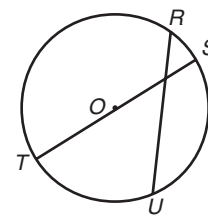
28. \widehat{JML}



29. \widehat{NPQ}



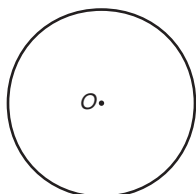
30. \widehat{TRS}



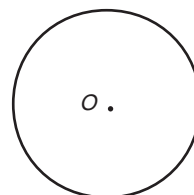
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Draw the part of a circle described.

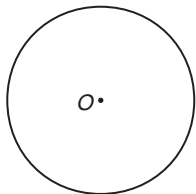
31. Draw chord \overline{AB} .



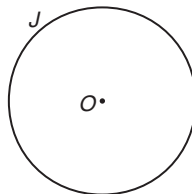
32. Draw radius \overline{OE} .



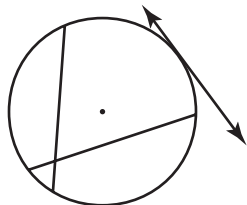
33. Draw secant \overline{GH} .



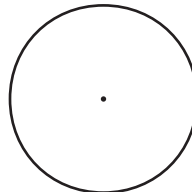
34. Draw a tangent at point J .



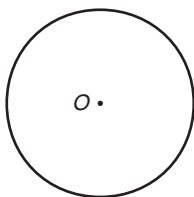
35. Label the point of tangency A .



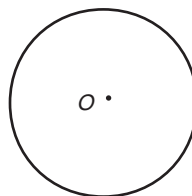
36. Draw center C .



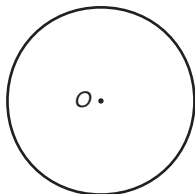
37. Draw inscribed angle $\angle FDG$.



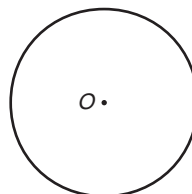
38. Draw central angle $\angle HOI$.



39. Draw major arc \widehat{KNM} .



40. Draw minor arc \widehat{RQ} .



Name _____ Date _____

Holding the Wheel Central Angles, Inscribed Angles, and Intercepted Arcs

Vocabulary

Define each term in your own words.

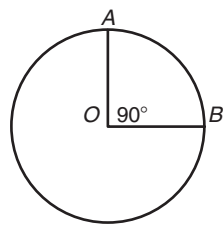
1. intercepted arc

2. measure of a minor arc

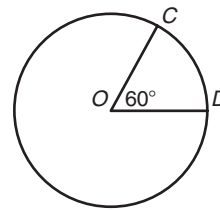
Problem Set

Determine the measure of each minor arc.

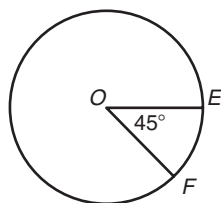
3. \widehat{AB}



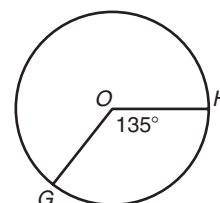
4. \widehat{CD}



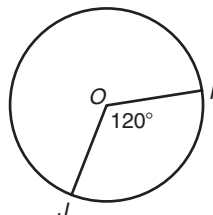
5. \widehat{EF}



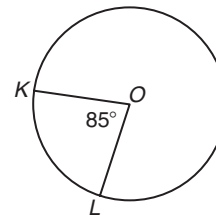
6. \widehat{GH}



7. \widehat{IJ}



8. \widehat{KL}



Calculate the measure of the major arc with the same endpoints as each minor arc.

9. The measure of \widehat{AB} is 45° .

10. The measure of \widehat{CD} is 75° .

11. The measure of \widehat{EF} is 108° .

12. The measure of \widehat{GH} is 96° .

13. The measure of \widehat{IJ} is 142° .

14. The measure of \widehat{KL} is 167° .

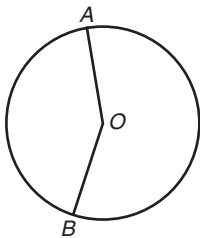
15. The measure of \widehat{MN} is 171° .

16. The measure of \widehat{OP} is 155° .

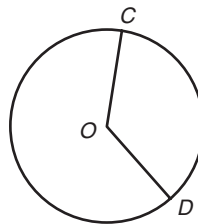
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Use a protractor to determine the measure of each minor arc.

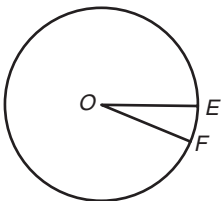
17. \widehat{AB}



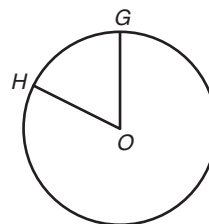
18. \widehat{CD}



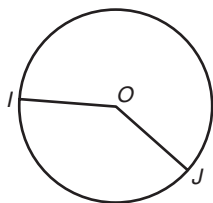
19. \widehat{EF}



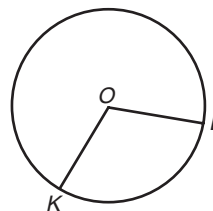
20. \widehat{GH}



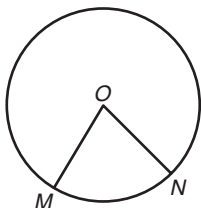
21. \widehat{IJ}



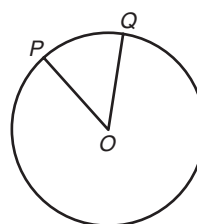
22. \widehat{KL}



23. \widehat{MN}

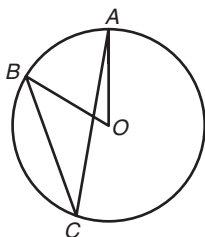


24. \widehat{PQ}

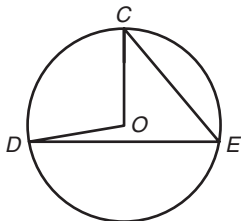


Calculate the measure of each angle.

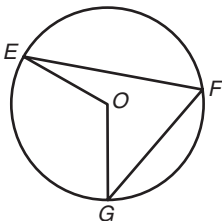
25. The measure of $\angle AOB$ is 62° . What is the measure of $\angle ACB$?



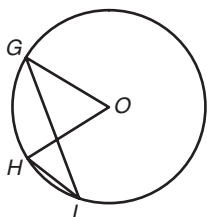
26. The measure of $\angle COD$ is 98° . What is the measure of $\angle CED$?



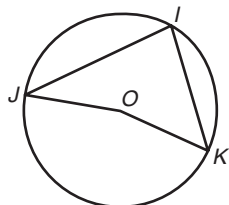
27. The measure of $\angle EOG$ is 128° . What is the measure of $\angle EFG$?



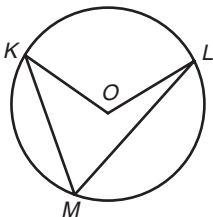
28. The measure of $\angle GOH$ is 74° . What is the measure of $\angle GIH$?



29. The measure of $\angle JOK$ is 168° . What is the measure of $\angle JIK$?

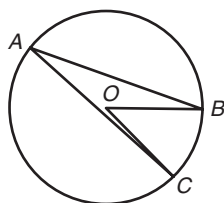


30. The measure of $\angle KOL$ is 148° . What is the measure of $\angle KML$?

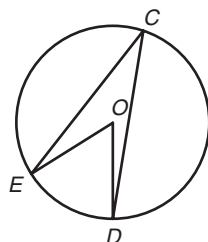


Calculate the measure of each angle.

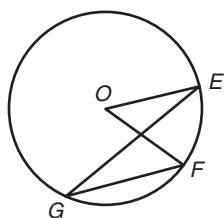
31. The measure of $\angle BAC$ is 23° . What is the measure of $\angle BOC$?



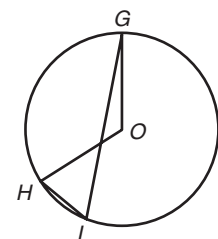
32. The measure of $\angle ECD$ is 35° . What is the measure of $\angle EOD$?



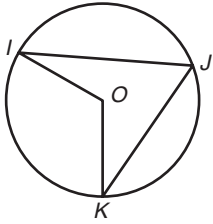
33. The measure of $\angle EGF$ is 28° . What is the measure of $\angle EOF$?



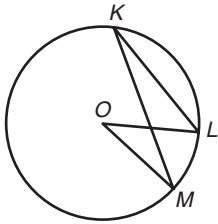
34. The measure of $\angle GIH$ is 66° . What is the measure of $\angle GOH$?



35. The measure of $\angle IJK$ is 54° . What is the measure of $\angle KOI$?



36. The measure of $\angle LKM$ is 19° . What is the measure of $\angle LOM$?



Name _____ Date _____

Manhole Covers Measuring Angles Inside and Outside of Circles

Vocabulary

Draw an example of each term. Explain how your example demonstrates the definition.

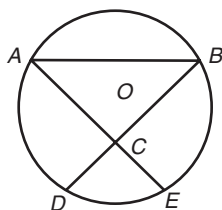
1. secant

2. tangent

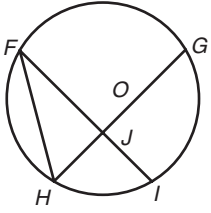
Problem Set

Calculate the measure of each angle.

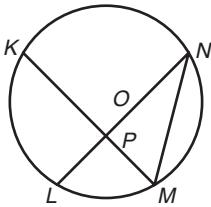
3. If the measure of \widehat{AD} is 100° , what is the measure of $\angle ABD$?



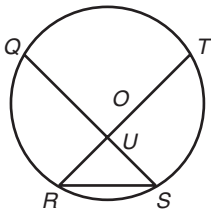
4. If the measure of \widehat{HI} is 60° , what is the measure of $\angle HFI$?



5. If the measure of \widehat{LM} is 50° and the measure of \widehat{KN} is 120° , what is the measure of $\angle LPM$?

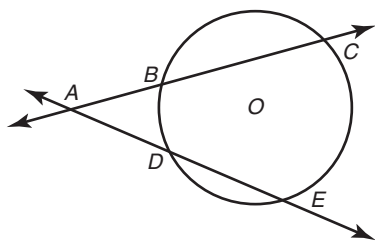


6. If the measure of \widehat{TS} is 94° and the measure of \widehat{QR} is 98° , what is the measure of $\angle TUS$?

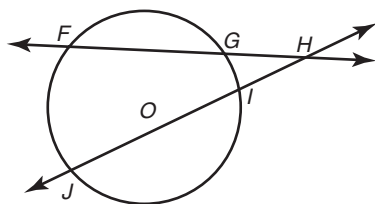


Calculate the measure of each angle.

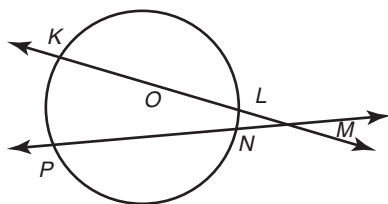
7. If the measure of \widehat{CE} is 133° and the measure of \widehat{BD} is 45° , what is the measure of $\angle CAE$?



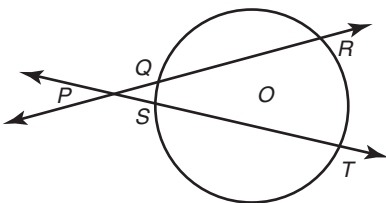
8. If the measure of \widehat{FJ} is 94° and the measure of \widehat{GI} is 22° , what is the measure of $\angle FHJ$?



9. If the measure of \widehat{KP} is 64° and the measure of \widehat{LN} is 32° , what is the measure of $\angle KMP$?

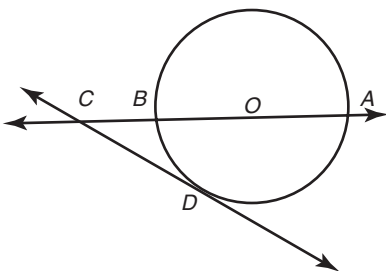


10. If the measure of \widehat{RT} is 78° and the measure of \widehat{QS} is 22° , what is the measure of $\angle RPT$?

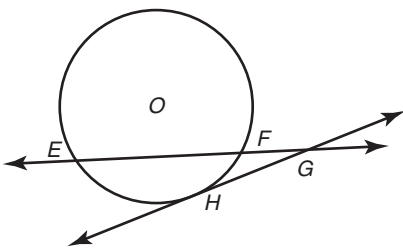


Calculate the measure of each angle.

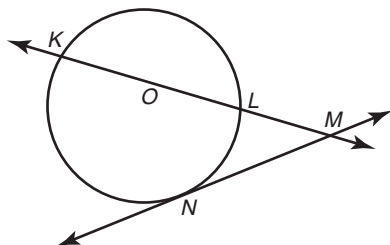
11. If the measure of \widehat{AD} is 126° and the measure of \widehat{BD} is 58° , what is the measure of $\angle ACD$?



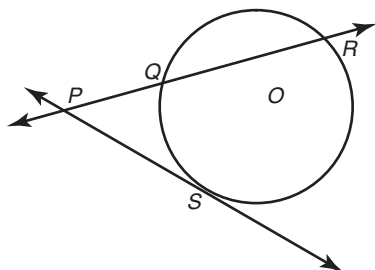
12. If the measure of \widehat{EH} is 84° and the measure of \widehat{FH} is 36° , what is the measure of $\angle EGH$?



13. If the measure of \widehat{KN} is 153° and the measure of \widehat{LN} is 57° , what is the measure of $\angle KMN$?

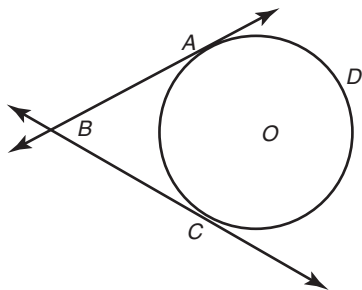


14. If the measure of \widehat{RS} is 171° and the measure of \widehat{QS} is 79° , what is the measure of $\angle RPS$?

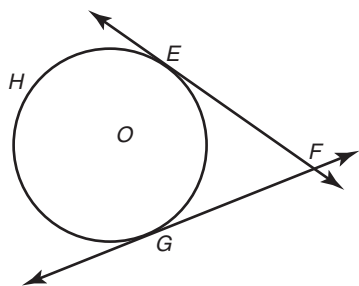


Calculate the measure of each angle.

15. If the measure of \widehat{ADC} is 250° and the measure of \widehat{AC} is 110° , what is the measure of $\angle ABC$?

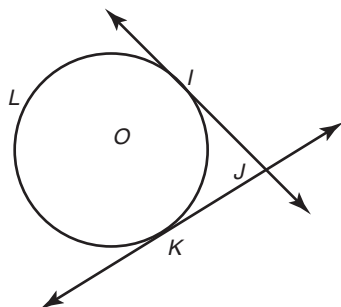


16. If the measure of \widehat{EHG} is 245° and the measure of \widehat{EG} is 115° , what is the measure of $\angle EFG$?

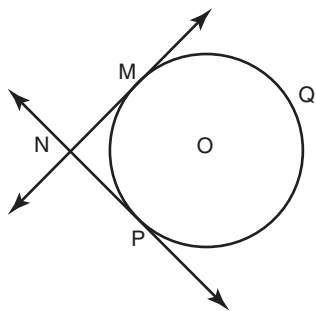


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17. If the measure of \widehat{ILK} is 256° and the measure of \widehat{IK} is 104° , what is the measure of $\angle IJK$?

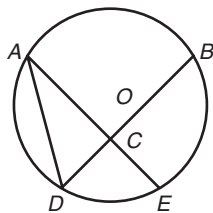


18. If the measure of \widehat{MQP} is 268° and the measure of \widehat{MP} is 92° , what is the measure of $\angle MNP$?

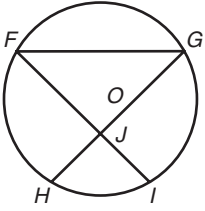


Write an argument for each statement.

19. Write an argument to show that $\angle ACB = \frac{1}{2}(m\widehat{AB} + m\widehat{DE})$.

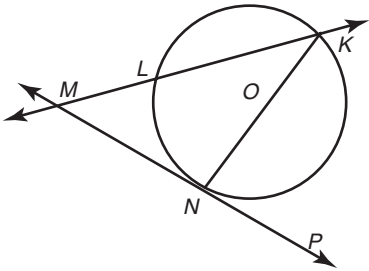


20. Write an argument to show that $\angle FJH = \frac{1}{2}(m\widehat{FH} + m\widehat{IG})$.



11

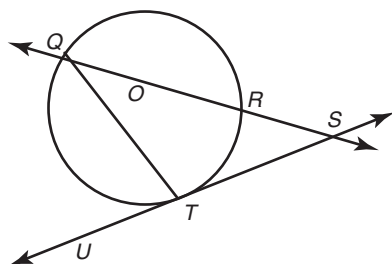
21. Write an argument to show that $\angle KMN = \frac{1}{2}(m\widehat{KN} - m\widehat{LN})$.



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22. Write an argument to show that $\angle QST = \frac{1}{2}(m\widehat{QT} - m\widehat{RT})$.



Name _____

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Color Theory Chords and Circles

Vocabulary

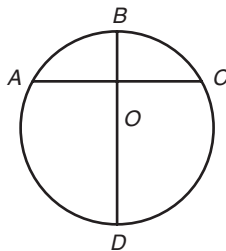
Match each definition with the corresponding term.

- | | |
|---|---------------------------|
| 1. a chord that passes through the center of a circle | a. arc |
| 2. a line, segment, or ray that intersects the midpoint of a line segment at a 90° angle | b. chord |
| 3. a segment whose endpoints are points on a circle | c. diameter |
| 4. an unbroken portion of a circle that lies between two points on the circle | d. perpendicular bisector |

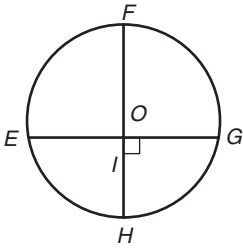
Problem Set

Calculate each measurement.

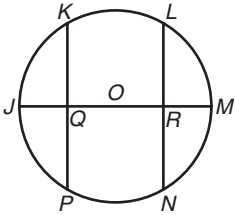
5. If diameter \overline{BD} bisects \overline{AC} , what is the angle of intersection?



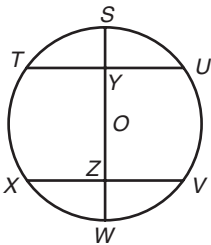
6. If diameter \overline{FH} intersects \overline{EG} at a right angle, how does the length of \overline{EI} compare to the length of \overline{IG} ?



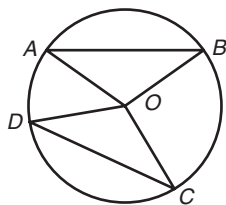
7. If $\overline{KP} \cong \overline{LN}$ and diameter \overline{JM} is a perpendicular bisector of both, how does the length of \overline{QO} compare to the length of \overline{RO} ?



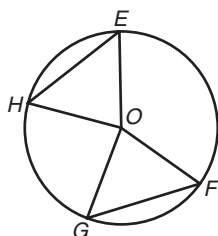
8. If $\overline{YO} \cong \overline{ZO}$ and diameter \overline{SW} intersects both \overline{TU} and \overline{XV} at right angles, what is the relationship between \overline{TU} and \overline{XV} ?



9. If $\angle AOB \cong \angle DOC$, what is the relationship between \overline{AB} and \overline{DC} ?

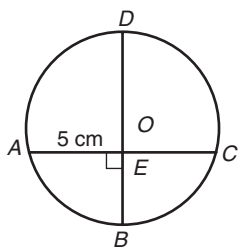


10. If $\angle EOH \cong \angle GOF$, what is the relationship between \widehat{EH} and \widehat{FG} ?

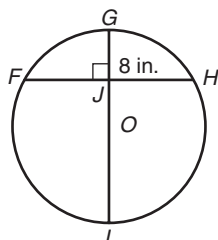


Calculate the length of each segment.

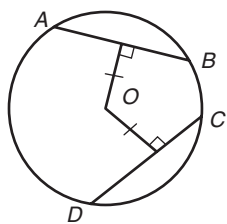
11. If \overline{BD} is a diameter, what is the length of \overline{EC} ?



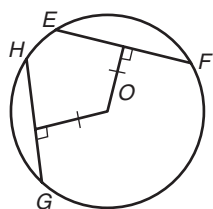
12. If \overline{IG} is a diameter, what is the length of \overline{FJ} ?



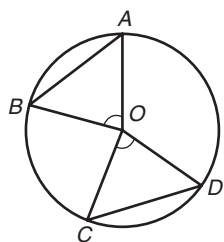
13. If the length of \overline{AB} is 13 millimeters, what is the length of \overline{CD} ?



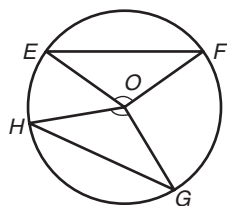
14. If the length of \overline{EF} is 23 feet, what is the length of \overline{HG} ?



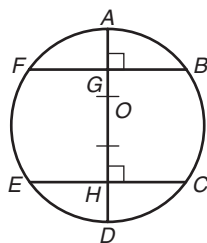
15. If the length of \overline{AB} is 24 centimeters, what is the length of \overline{CD} ?



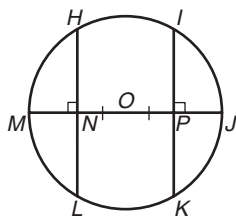
16. If the length of \overline{EF} is 14 millimeters, what is the length of \overline{HG} ?



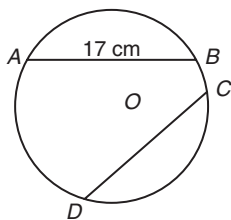
17. If the length of \overline{BF} is 32 inches, what is the length of \overline{CH} ?



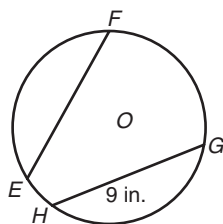
18. If the length of \overline{HN} is 19 meters, what is the length of \overline{IK} ?



19. If \widehat{AB} is congruent to \widehat{CD} , what is the length of \overline{CD} ?

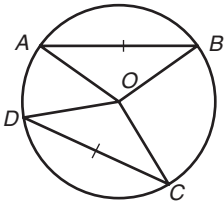


20. If \widehat{EF} is congruent to \widehat{GH} , what is the length of \overline{EF} ?

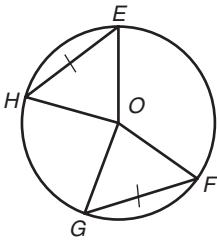


Calculate the measure of each angle.

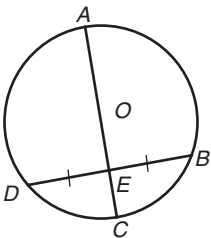
21. If the measure of $\angle AOB = 155^\circ$, what is the measure of $\angle DOC$?



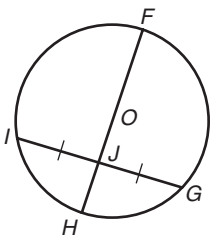
22. If the measure of $\angle GOF = 83^\circ$, what is the measure of $\angle EOH$?



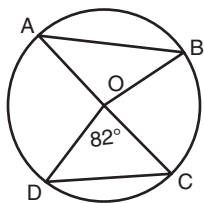
23. If segment \overline{AC} is a diameter, what is the measure of $\angle AED$?



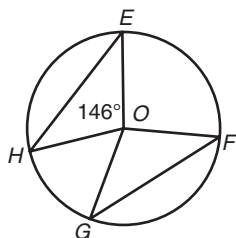
24. If segment \overline{FH} is a diameter, what is the measure of $\angle IJF$?



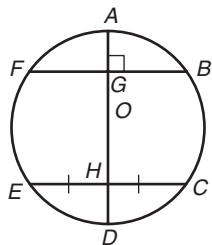
25. If \widehat{AB} is congruent to \widehat{CD} , what is the measure of $\angle AOB$?



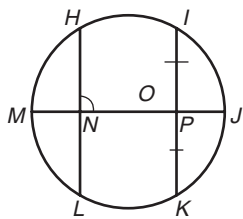
26. If \widehat{HE} is congruent to \widehat{GF} , what is the measure of $\angle GOF$?



27. If $\overline{EH} \cong \overline{CH}$, what is the measure of $\angle DHE$?



28. If $\overline{HN} \cong \overline{PK}$, what is the measure of $\angle JPK$?



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Solar Eclipses Tangents and Circles

Vocabulary

Describe the similarities and differences between each pair of terms.

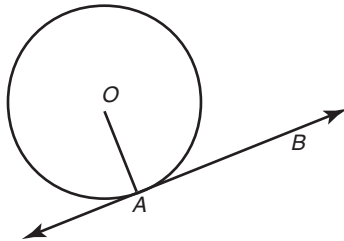
1. tangent segment, radius

2. tangent line, point of tangency

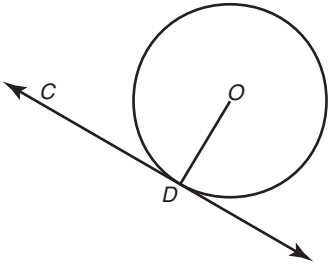
Problem Set

Calculate the measure of each angle.

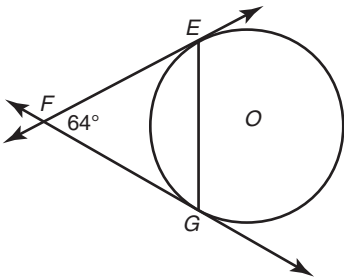
3. If \overline{OA} is a radius, what is the measure of $\angle OAB$?



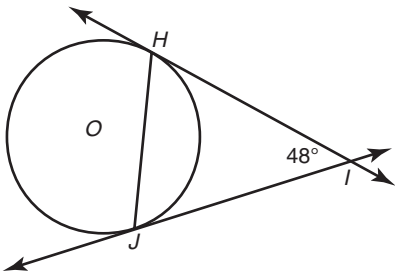
4. If \overline{OD} is a radius, what is the measure of $\angle ODC$?



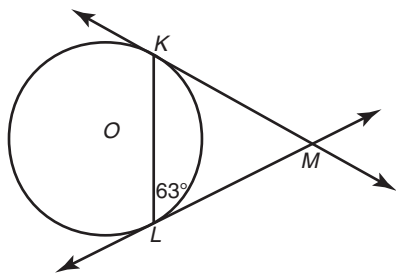
5. If \overline{EF} and \overline{GF} are tangent segments, what is the measure of $\angle EGF$?



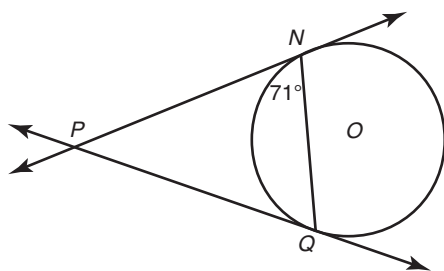
6. If \overline{HI} and \overline{JI} are tangent segments, what is the measure of $\angle HJI$?



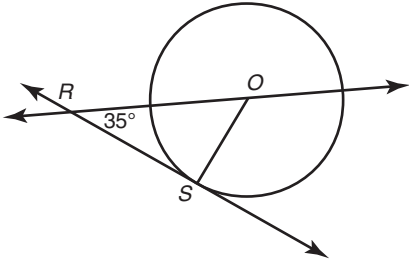
7. If \overline{KM} and \overline{LM} are tangent segments, what is the measure of $\angle KML$?



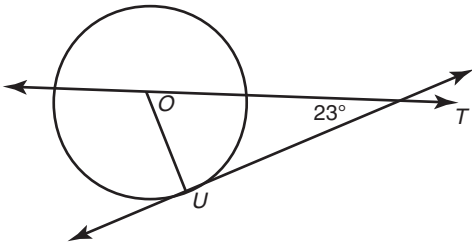
8. If \overline{NP} and \overline{QP} are tangent segments, what is the measure of $\angle NPQ$?



9. If \overline{RS} is a tangent segment and \overline{OS} is a radius, what is the measure of $\angle ROS$?

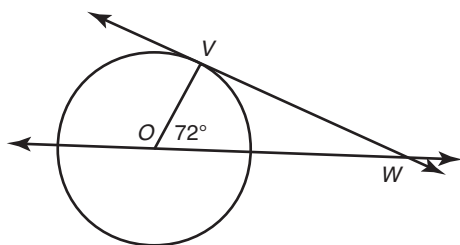


10. If \overline{UT} is a tangent segment and \overline{OU} is a radius, what is the measure of $\angle TOU$?

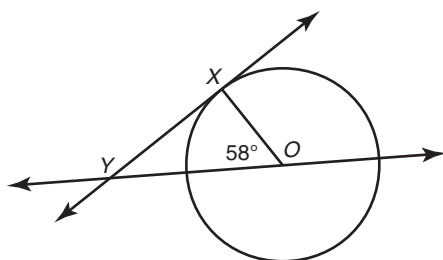


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11. If \overline{VW} is a tangent segment and \overline{OV} is a radius, what is the measure of $\angle VWO$?

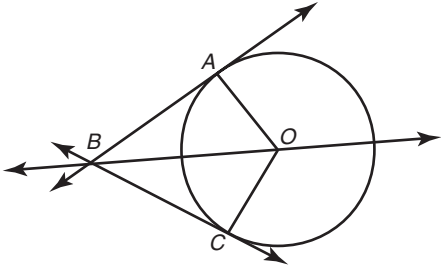


12. If \overline{XY} is a tangent segment and \overline{OX} is a radius, what is the measure of $\angle XYO$?



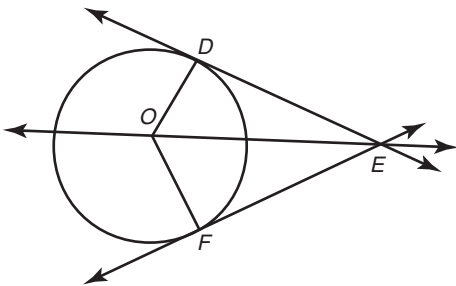
Write a paragraph proof to prove each statement.

13. Given that \overline{OA} and \overline{OC} are radii and \overline{AB} and \overline{CB} are tangent segments, use the HL Congruence Theorem to prove that $\angle BOA \cong \angle BOC$.

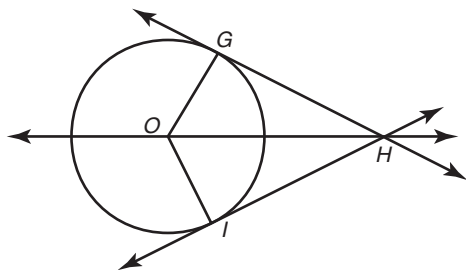


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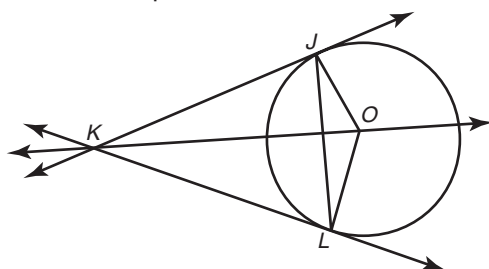
14. Given that \overline{OD} and \overline{OF} are radii and \overline{DE} and \overline{FE} are tangent segments, use the HL Congruence Theorem to prove that $\angle DEO \cong \angle FEO$.



15. Given that \overline{GO} and \overline{IO} are radii and \overline{GH} and \overline{IH} are tangent segments, use the HL Congruence Theorem to prove that $\overline{GH} \cong \overline{IH}$.



16. Given that \overline{OJ} and \overline{OL} are radii and \overline{JK} and \overline{LK} are tangent segments, use the HL Congruence Theorem to prove that $\angle KJL \cong \angle KLJ$.



Name _____ Date _____

Gears Arc Length

Vocabulary

Define the key term in your own words.

1. arc length

Problem Set

Calculate the ratio of the length of each arc to the circle's circumference.

2. The measure of \widehat{AB} is 40° .
3. The measure of \widehat{CD} is 90° .
4. The measure of \widehat{EF} is 120° .
5. The measure of \widehat{GH} is 150° .
6. The measure of \widehat{IJ} is 105° .
7. The measure of \widehat{KL} is 75° .

Calculate each arc length. Write your answer in terms of π .

8. If the measure of \widehat{AB} is 45° and the radius is 12 meters, what is the arc length of \widehat{AB} ?

9. If the measure of \widehat{CD} is 120° and the radius is 15 centimeters, what is the arc length of \widehat{CD} ?

10. If the measure of \widehat{EF} is 60° and the radius is 8 inches, what is the arc length of \widehat{EF} ?

11. If the measure of \widehat{GH} is 30° and the radius is 6 meters, what is the arc length of \widehat{GH} ?

11

12. If the measure of \widehat{IJ} is 80° and the diameter is 10 centimeters, what is the arc length of \widehat{IJ} ?

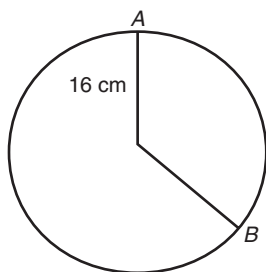
13. If the measure of \widehat{KL} is 15° and the diameter is 18 feet, what is the arc length of \widehat{KL} ?

14. If the measure of \widehat{MN} is 75° and the diameter is 20 millimeters, what is the arc length of \widehat{MN} ?

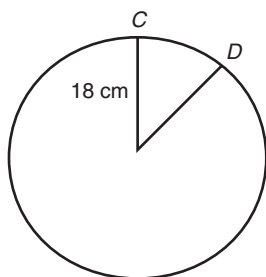
15. If the measure of \widehat{OP} is 165° and the diameter is 21 centimeters, what is the arc length of \widehat{OP} ?

Calculate each arc length. Write your answer in terms of π .

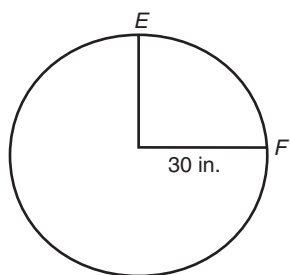
16. If the measure of \widehat{AB} is 135° , what is the arc length of \widehat{AB} ?



17. If the measure of \widehat{CD} is 45° , what is the arc length of \widehat{CD} ?

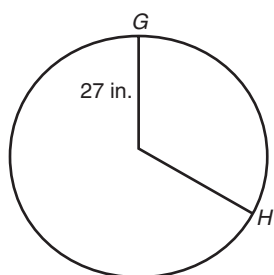


18. If the measure of \widehat{EF} is 90° , what is the arc length of \widehat{EF} ?



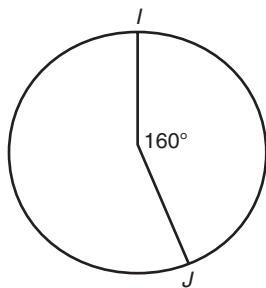
11

19. If the measure of \widehat{GH} is 120° , what is the arc length of \widehat{GH} ?

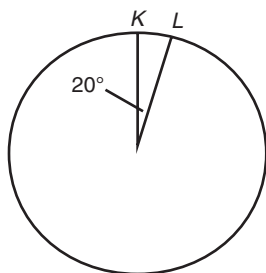


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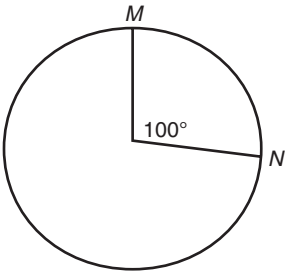
20. If the length of the radius is 4 centimeters, what is the arc length of \widehat{IJ} ?



21. If the length of the radius is 7 centimeters, what is the arc length of \widehat{KL} ?

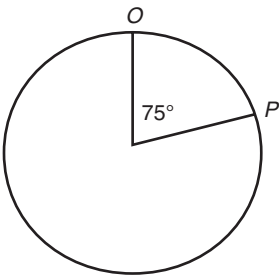


-
22. If the length of the radius is 11 centimeters, what is the arc length of \widehat{MN} ?



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23. If the length of the radius is 17 centimeters, what is the arc length of \widehat{OP} ?



Skills Practice

Name _____ Date _____

Playing Darts Areas of Parts of Circles

Vocabulary

Write the term from the box that best completes the statement.

concentric	sector of a circle	segment of a circle
------------	--------------------	---------------------

1. A portion of a circle bounded by two radii of the circle and one of the arcs that they intercept is a _____.
2. A _____ is the region bounded by a chord of a circle and the arc that the chord creates.
3. _____ circles are circles in the same plane that have a common center.

11

Problem Set

Calculate the area of each circle. Write your answer in terms of π .

4. What is the area of a circle whose radius is 5 centimeters?
5. What is the area of a circle whose radius is 8 millimeters?
6. What is the area of a circle whose radius is 12 feet?
7. What is the area of a circle whose radius is 18 centimeters?

8. What is the area of a circle whose diameter is 22 inches?

9. What is the area of a circle whose diameter is 28 meters?

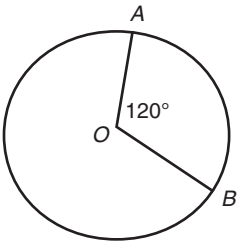
10. What is the area of a circle whose diameter is 15 inches?

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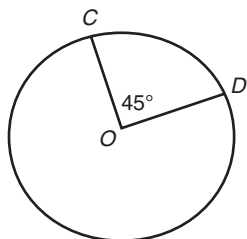
11. What is the area of a circle whose diameter is 31 yards?

Calculate the area of each sector. Write your answer in terms of π .

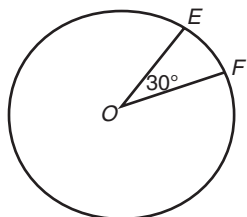
12. If the radius of the circle is 9 centimeters, what is the area of sector AOB ?



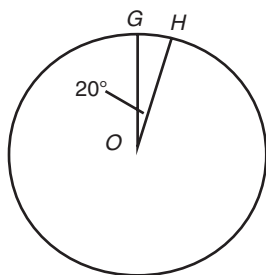
13. If the radius of the circle is 16 meters, what is the area of sector COD ?



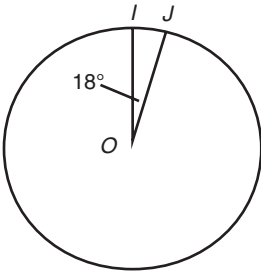
14. If the radius of the circle is 15 feet, what is the area of sector EOF ?



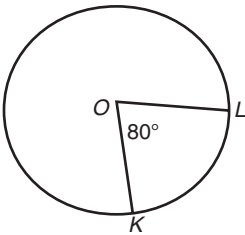
15. If the radius of the circle is 10 inches, what is the area of sector GOH ?



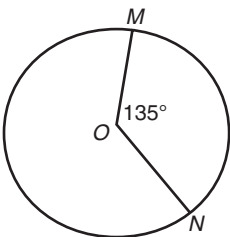
16. If the radius of the circle is 32 centimeters, what is the area of sector IOJ ?



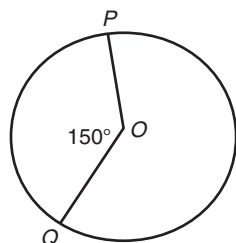
17. If the radius of the circle is 20 millimeters, what is the area of sector KOL ?



18. If the radius of the circle is 24 centimeters, what is the area of sector MON ?

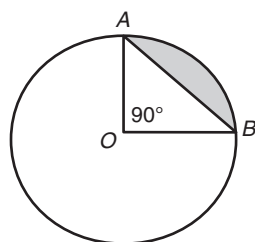


19. If the radius of the circle is 21 meters, what is the area of sector POQ ?

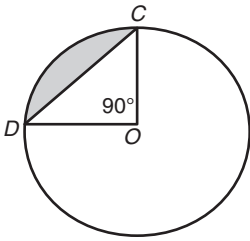


Calculate the area of each sector. Round your answer to the nearest tenth, if necessary. Use 3.14 as an estimate for π .

20. If the radius of the circle is 6 centimeters, what is the area of the shaded segment?

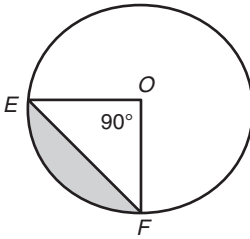


21. If the radius of the circle is 14 inches, what is the area of the shaded segment?



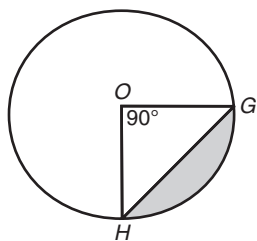
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22. If the radius of the circle is 17 feet, what is the area of the shaded segment?



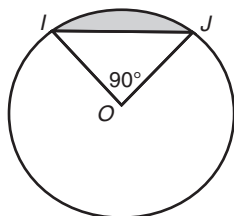
Name _____ Date _____

23. If the radius of the circle is 22 centimeters, what is the area of the shaded segment?

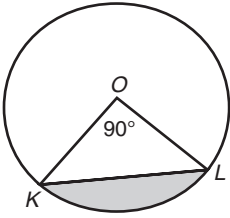


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24. If the radius of the circle is 25 meters, what is the area of the shaded segment?



25. If the radius of the circle is 30 centimeters, what is the area of the shaded segment?



Name _____

Date _____

Getting a Round the Coordinate Plane Circles in the Coordinate Plane

Vocabulary

Match each definition with its corresponding term.

- | | |
|---|---|
| 1. The equation $(x - h)^2 + (y - k)^2 = r^2$ where r is the radius and (h, k) is the center. | a. circle |
| 2. The set of all points in a plane that are the same distance from a given point, called the center. | b. locus |
| 3. A collection of points that share a property. | c. center-radius form of the equation of a circle |

Problem Set

Write an equation in center-radius form for each circle.

- The center of a circle is $(0, 0)$ and its radius is 4.
- The center of a circle is $(0, 0)$ and its radius is 6.
- The center of a circle is $(1, 5)$ and its radius is 3.
- The center of a circle is $(4, 3)$ and its radius is 7.

8. The center of a circle is $(7, -4)$ and its radius is 9.

9. The center of a circle is $(-6, 8)$ and its radius is 2.

10. The center of a circle is $(-3, -5)$ and its radius is 8.

11. The center of a circle is $(-9, -1)$ and its radius is 5.

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Determine the center and radius of each circle.

12. $(x - 4)^2 + (y - 2)^2 = 100$

13. $(x - 7)^2 + (y - 5)^2 = 144$

14. $(x + 1)^2 + (y - 6)^2 = 196$

15. $(x + 4)^2 + (y - 8)^2 = 169$

16. $(x - 5)^2 + (y + 9)^2 = 64$

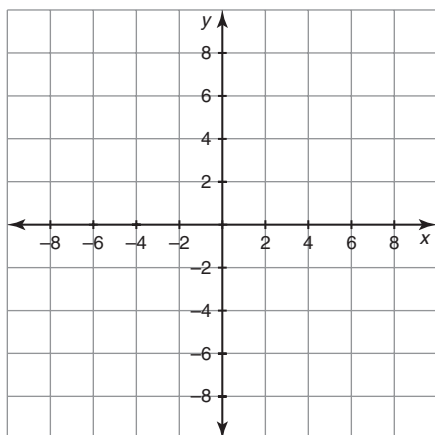
17. $(x - 2)^2 + (y + 3)^2 = 36$

18. $(x + 8)^2 + (y + 7)^2 = 121$

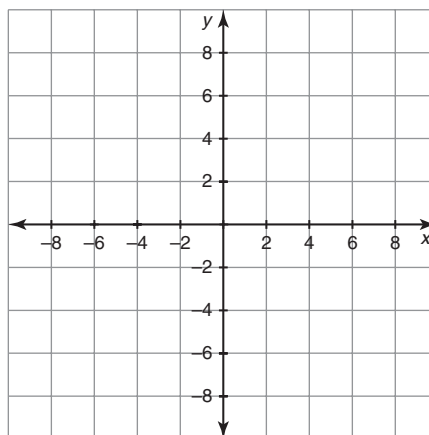
19. $(x + 6)^2 + (y + 1)^2 = 225$

Sketch a graph of each circle.

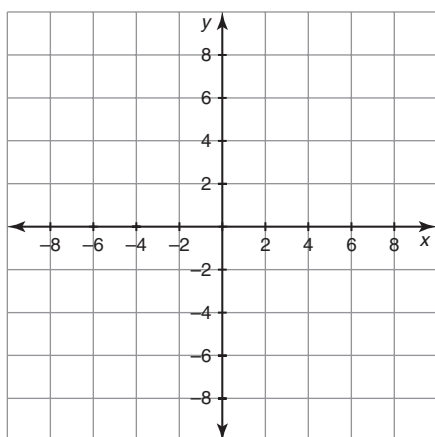
20. $(x - 1)^2 + (y - 2)^2 = 49$



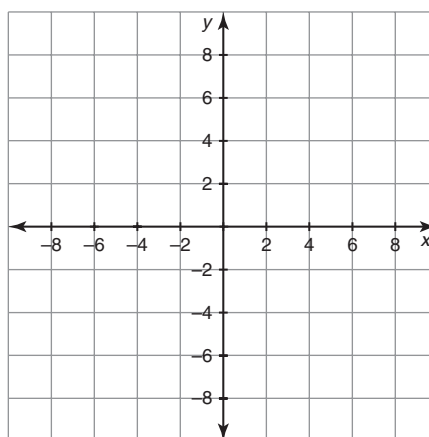
21. $(x - 6)^2 + (y + 4)^2 = 9$



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

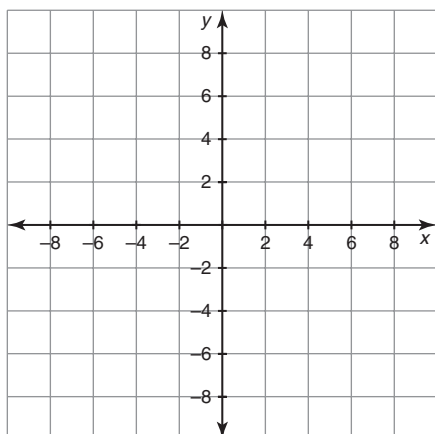


23. $(x + 3)^2 + (y + 2)^2 = 16$

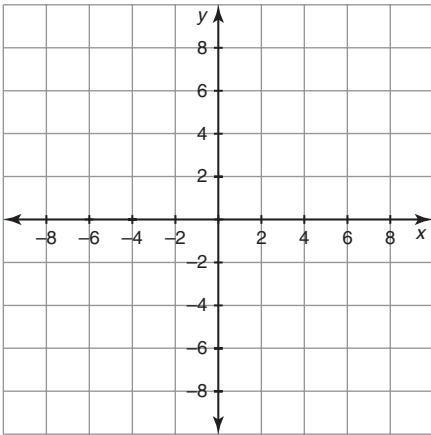


Sketch a graph of each circle.

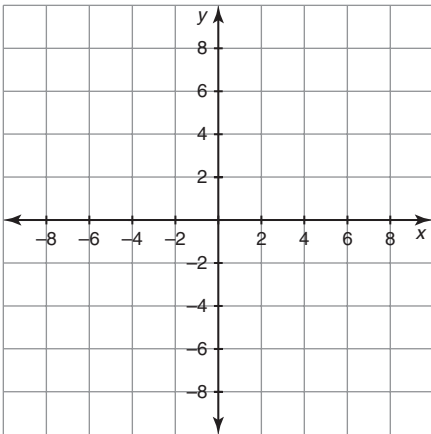
24. A circle whose radius is 6 and whose center is $(-3, 1)$.



25. A circle whose radius is 4 and whose center is $(2, -4)$.



26. A circle whose radius is 2 and whose center is $(-5, -7)$.



27. A circle whose radius is 3 and whose center is $(2, 5)$.

