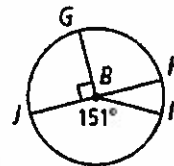


11/1-3 Practice Arc Length, Radian, Sector Area Form G

Circles and Arcs

Find the measure of each arc in $\odot B$.

1. \widehat{GJ} 2. \widehat{HI} 3. \widehat{HIJ}
 4. \widehat{GJI} 5. \widehat{GHJ} 6. \widehat{GJH}

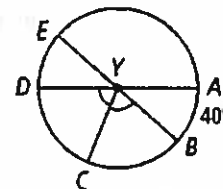


Find the length of each darkened arc. Leave your answer in terms of π .

7. 8. 9.
 10. 11. 12.

Find each indicated measure for $\odot Y$.

13. $m\angle EYD$ 14. $m\widehat{EAB}$ 15. $m\widehat{DB}$
 16. $m\angle DYC$ 17. $m\widehat{AEC}$ 18. $m\widehat{BDA}$

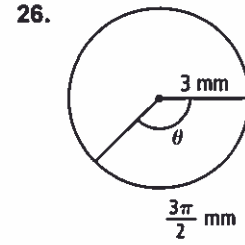
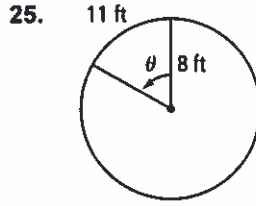
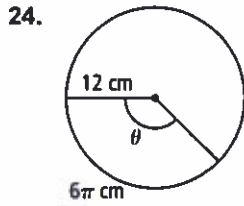


19. Kiley's in-line skate wheels have a 43-mm diameter. How many meters will Kiley travel after 5000 revolutions of the wheels on her in-line skates? Round your answer to the nearest tenth of a meter.
 20. It is 5:00. What is the measure of the minor arc formed by the hands of an analog clock?

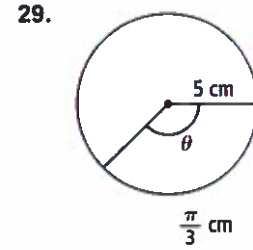
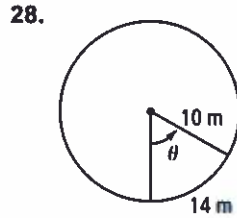
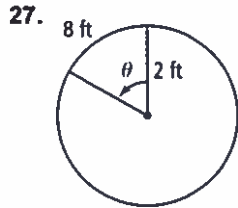
Algebra Find the value of each variable.

21. 22. 23.

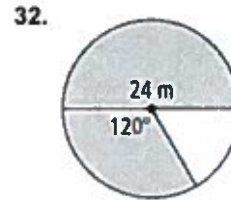
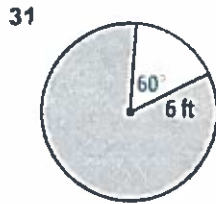
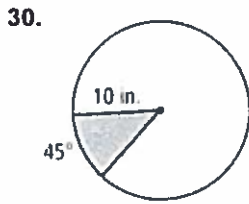
The radius and arc length are given. Find the radian measure of the central angle.



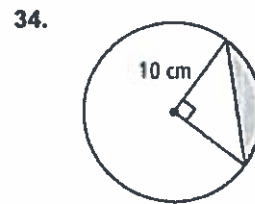
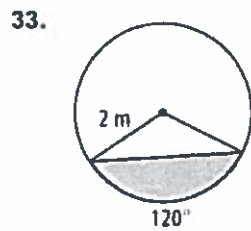
The radius and arc length are given. Find the radian measure of the central angle.



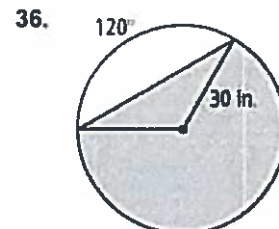
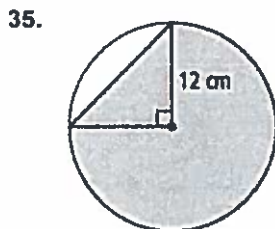
Find the area of each shaded sector of a circle. Leave your answer in terms of π .



Find the area of each shaded segment. Round your answer to the nearest tenth.



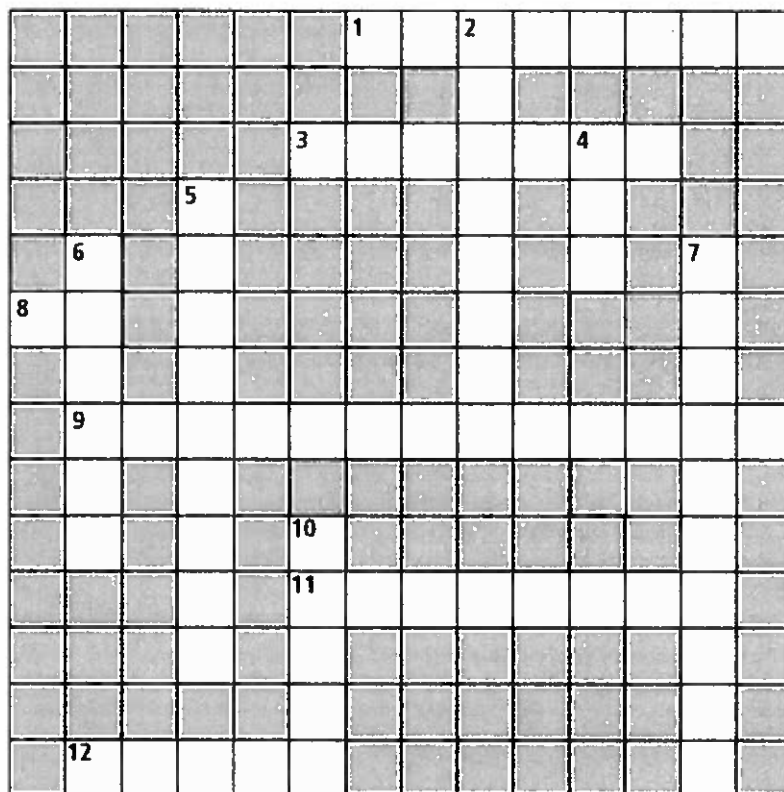
Find the area of the shaded region. Leave your answer in terms of π and in simplest radical form.



11-1 Puzzle: Crossword

Circles and Arcs

All of the clues below involve vocabulary you have learned earlier in the course. Write each answer in the crossword puzzle below. Any numerical answers should be written in word form.



Across

1. The segment that contains the center of a circle and has both endpoints on the circle is called the ? .
3. A(n) ? angle is one whose vertex is the center of a circle.
8. The ratio of the circumference of a circle to its diameter is known as ? .
9. The ? is the distance around a circle.
11. ? arcs are arcs of the same circle that have exactly one point in common.
12. An arc that is smaller than a semicircle is called a(n) ? arc.

Down

2. The ? of a triangle is the segment drawn from a vertex perpendicular to the line containing the opposite side.
4. A section of the circumference of a circle between two points on the circle is an ? .
5. Arcs that have the same measure and are in the same circle are called ? arcs.
6. A(n) ? is the set of all points equidistant from a given point.
7. ? circles are coplanar circles that have the same center.
10. Arcs named with three points are ? arcs.

11-1 Additional Vocabulary Support

Circles and Arcs

Concept List

adjacent arcs

central angle

circumference

concentric circles

diameter

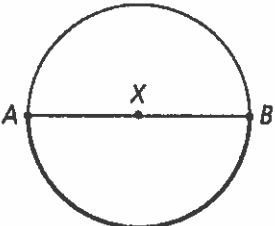
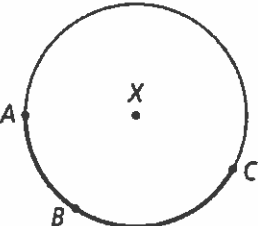
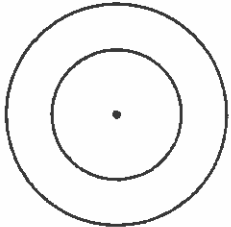
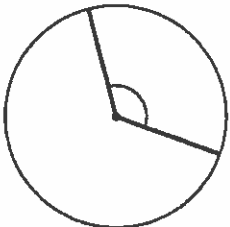
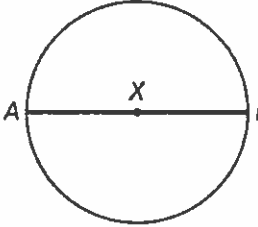
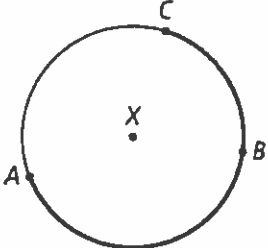
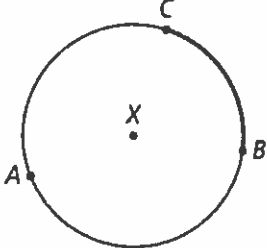
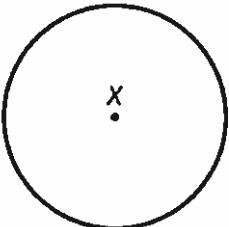
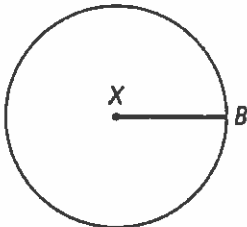
major arc

minor arc

radius

semicircle

Choose the concept from the list above that best represents the item in each box.

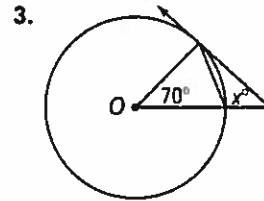
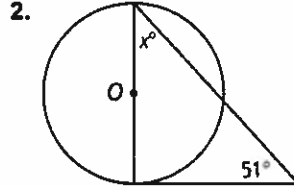
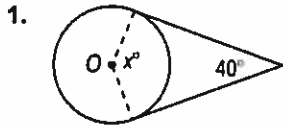
<p>1. \widehat{AB}</p> 	<p>2. \widehat{AB} and \widehat{BC}</p> 	<p>3.</p> 
<p>4.</p> 	<p>5.</p> 	<p>6. \widehat{ABC}</p> 
<p>7. \widehat{CB}</p> 	<p>8.</p> 	<p>9.</p> 

12/1-2 Practice Tangents and Chords

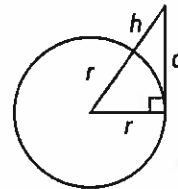
Form G

Tangent Lines

Algebra Assume that lines that appear to be tangent are tangent. O is the center of each circle. What is the value of x ?



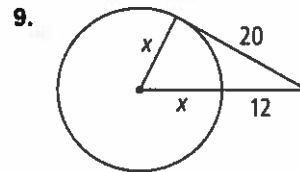
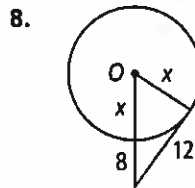
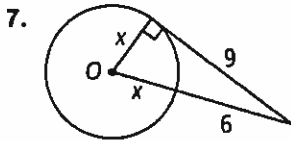
The circle at the right represents Earth. The radius of the Earth is about 6400 km. Find the distance d that a person can see on a clear day from each of the following heights h above Earth. Round your answer to the nearest tenth of a kilometer.



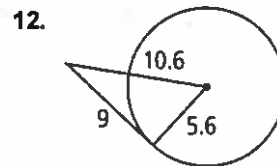
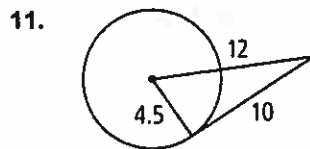
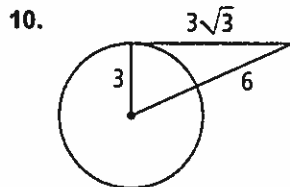
4. 12 km

5. 20 km

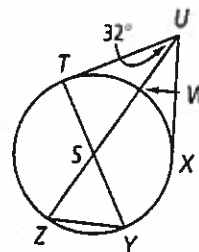
In each circle, what is the value of x to the nearest tenth?



Determine whether a tangent line is shown in each diagram. Explain.



13. \overline{TY} and \overline{ZW} are diameters of $\odot S$. \overline{TU} and \overline{UX} are tangents of $\odot S$. What is $m\angle SYZ$?

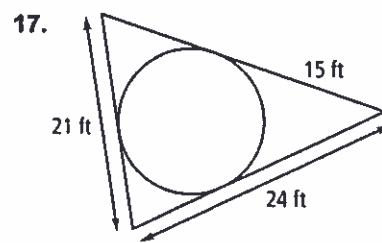
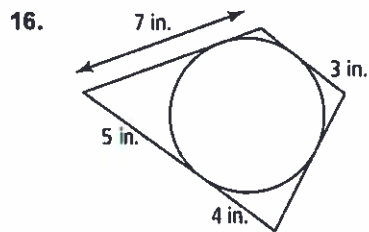
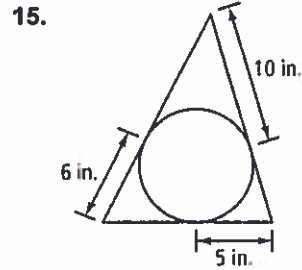
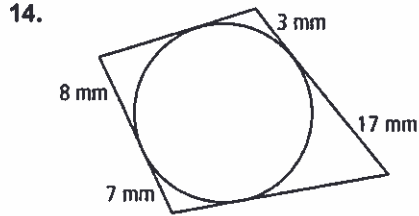


12-1 Practice (continued)

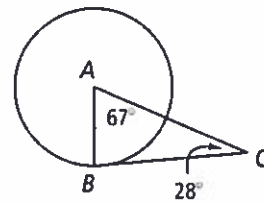
Form G

Tangent Lines

Each polygon circumscribes a circle. What is the perimeter of each polygon?

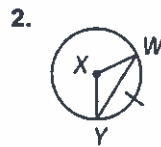
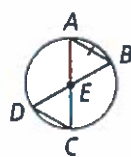
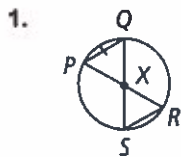


18. **Error Analysis** A classmate states that \overline{BC} is tangent to $\odot A$. Explain how to show that your classmate is wrong.

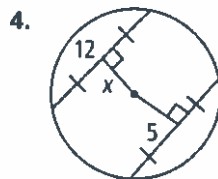
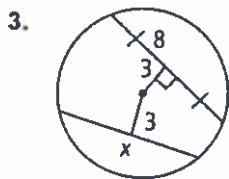


Chords 12-2:

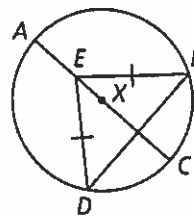
In Exercises 1 and 2, $\odot X \cong \odot E$. What can you conclude?



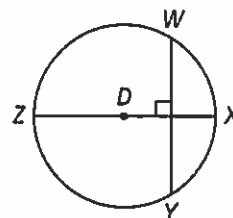
Find the value of x .



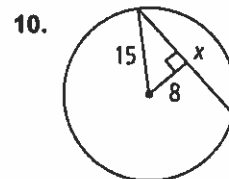
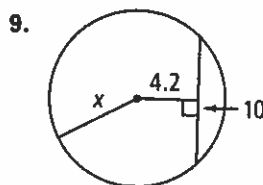
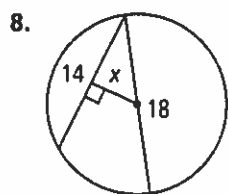
6. In $\odot X$, \overline{AC} is a diameter and $\overline{ED} \cong \overline{EB}$. What can you conclude about \widehat{DC} and \widehat{CB} ? Explain.



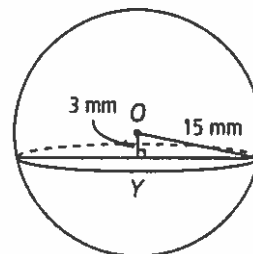
7. In $\odot D$, \overline{ZX} is the diameter of the circle and $\overline{ZX} \perp \overline{WY}$. What conclusions can you make? Justify your answer.



Find the value of x to the nearest tenth.



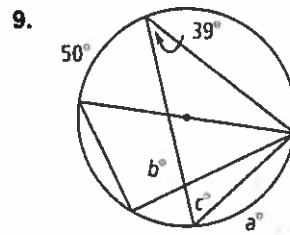
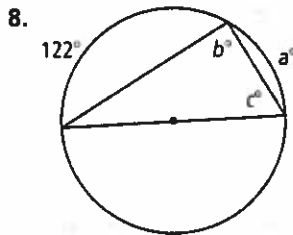
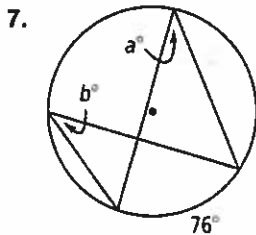
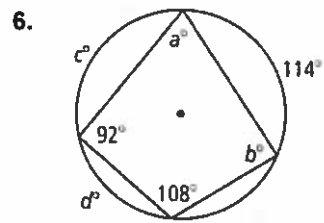
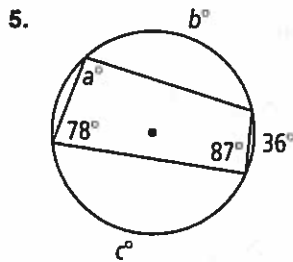
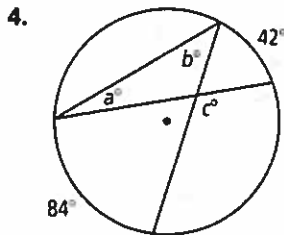
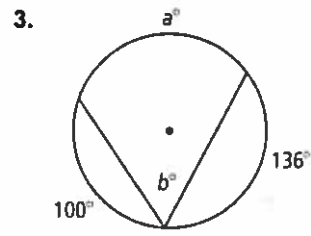
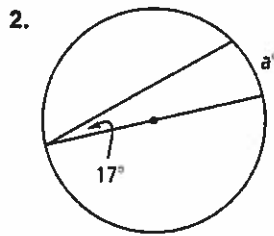
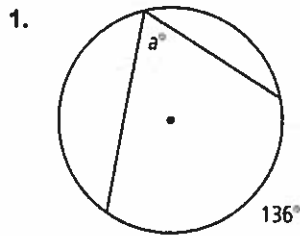
11. In the figure at the right, sphere O with radius 15 mm is intersected by a plane 3 mm from the center. To the nearest tenth, find the radius of the cross section $\odot Y$.



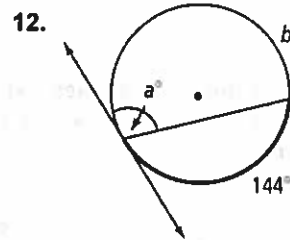
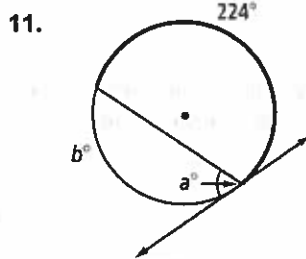
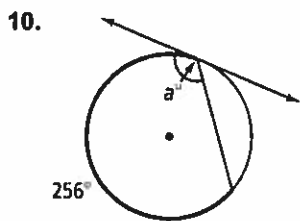
12-3 Practice

Inscribed Angles

Find the value of each variable. For each circle, the dot represents the center.



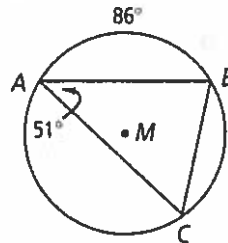
Find the value of each variable. Lines that appear to be tangent are tangent.



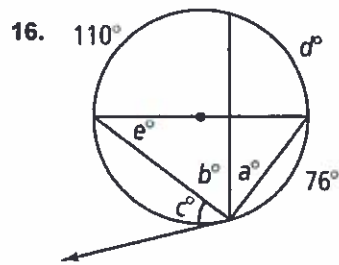
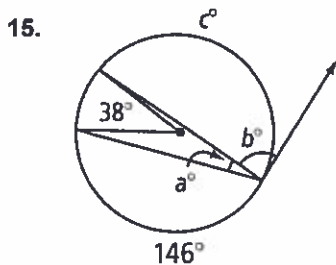
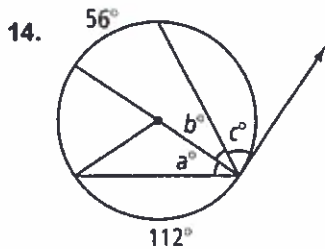
Find each indicated measure for $\odot M$.

13. a. $m\angle B$
c. $m\widehat{BC}$

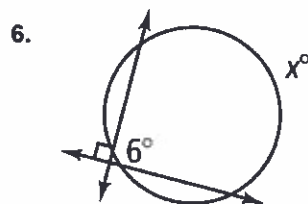
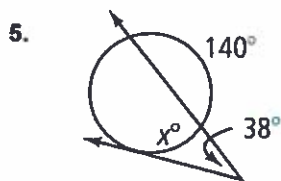
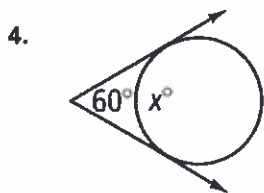
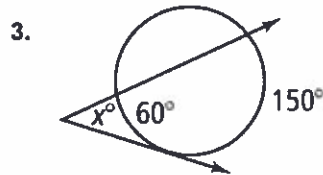
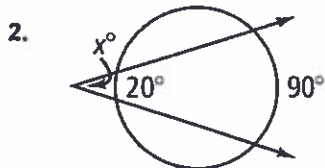
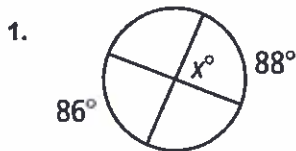
- b. $m\angle C$
d. $m\widehat{AC}$



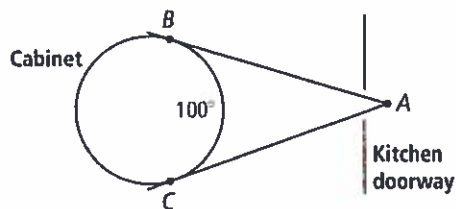
Find the value of each variable. For each circle, the dot represents the center.



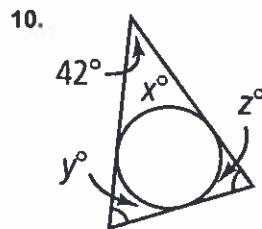
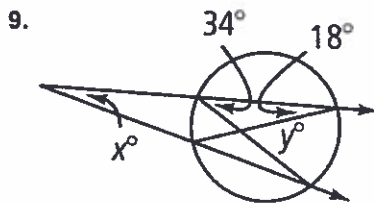
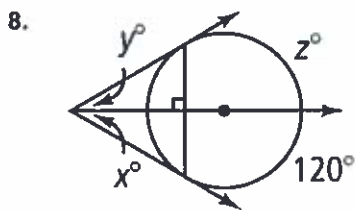
Find the value of x .



7. There is a circular cabinet in the dining room. Looking in from another room at point A , you estimate that you can see an arc of the cabinet of about 100° . What is the measure of $\angle A$ formed by the tangents to the cabinet?



Algebra Find the value of each variable using the given chord, secant, and tangent lengths. If the answer is not a whole number, round to the nearest tenth.

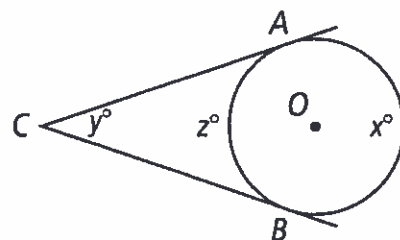


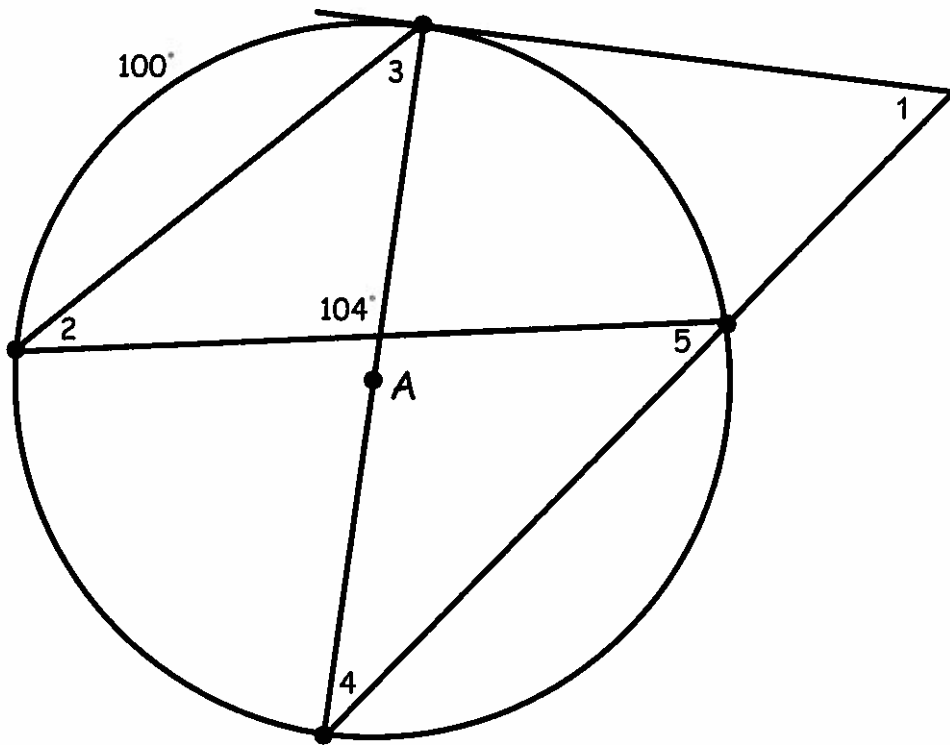
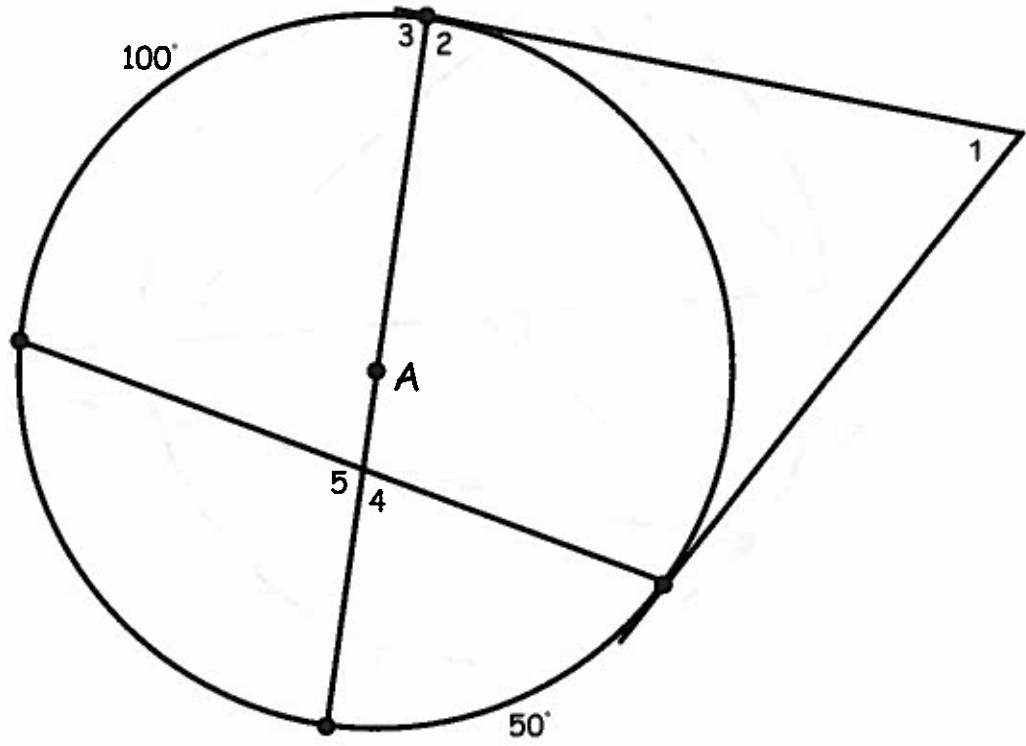
Algebra \overline{CA} and \overline{CB} are tangents to $\odot O$. Write an expression for each arc or angle in terms of the given variable.

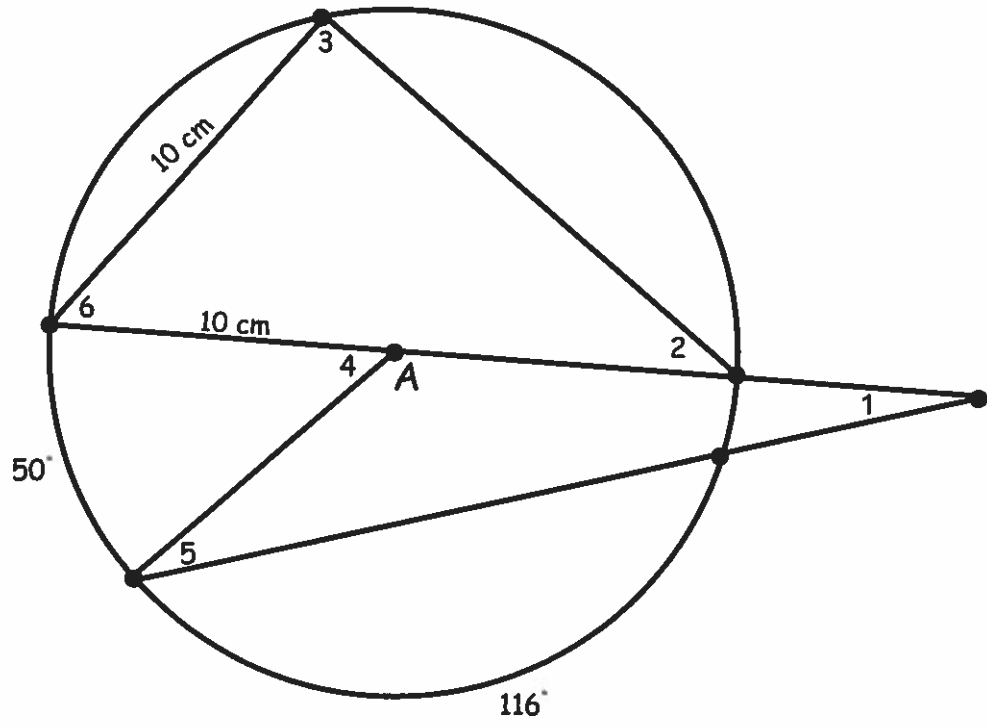
14. $m\widehat{AB}$ using x

15. $m\widehat{AB}$ using Y

16. $m\angle C$ using x

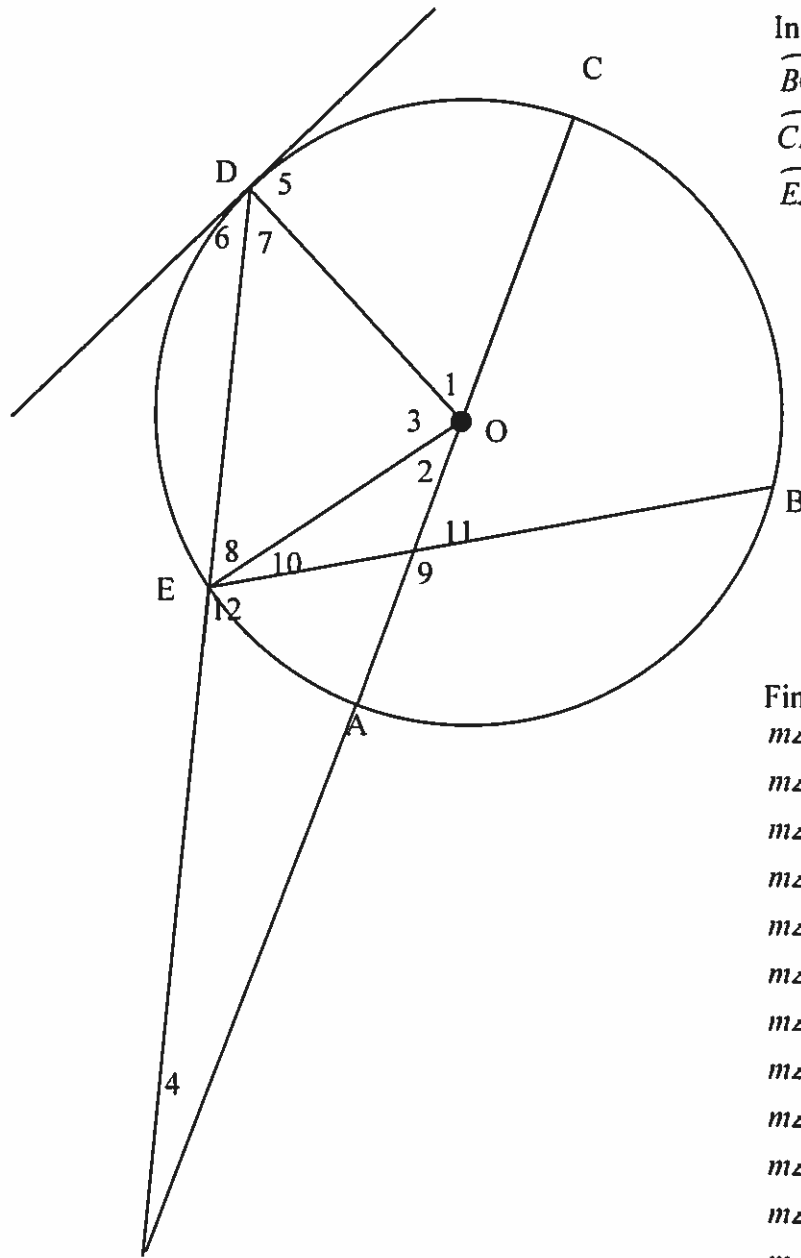






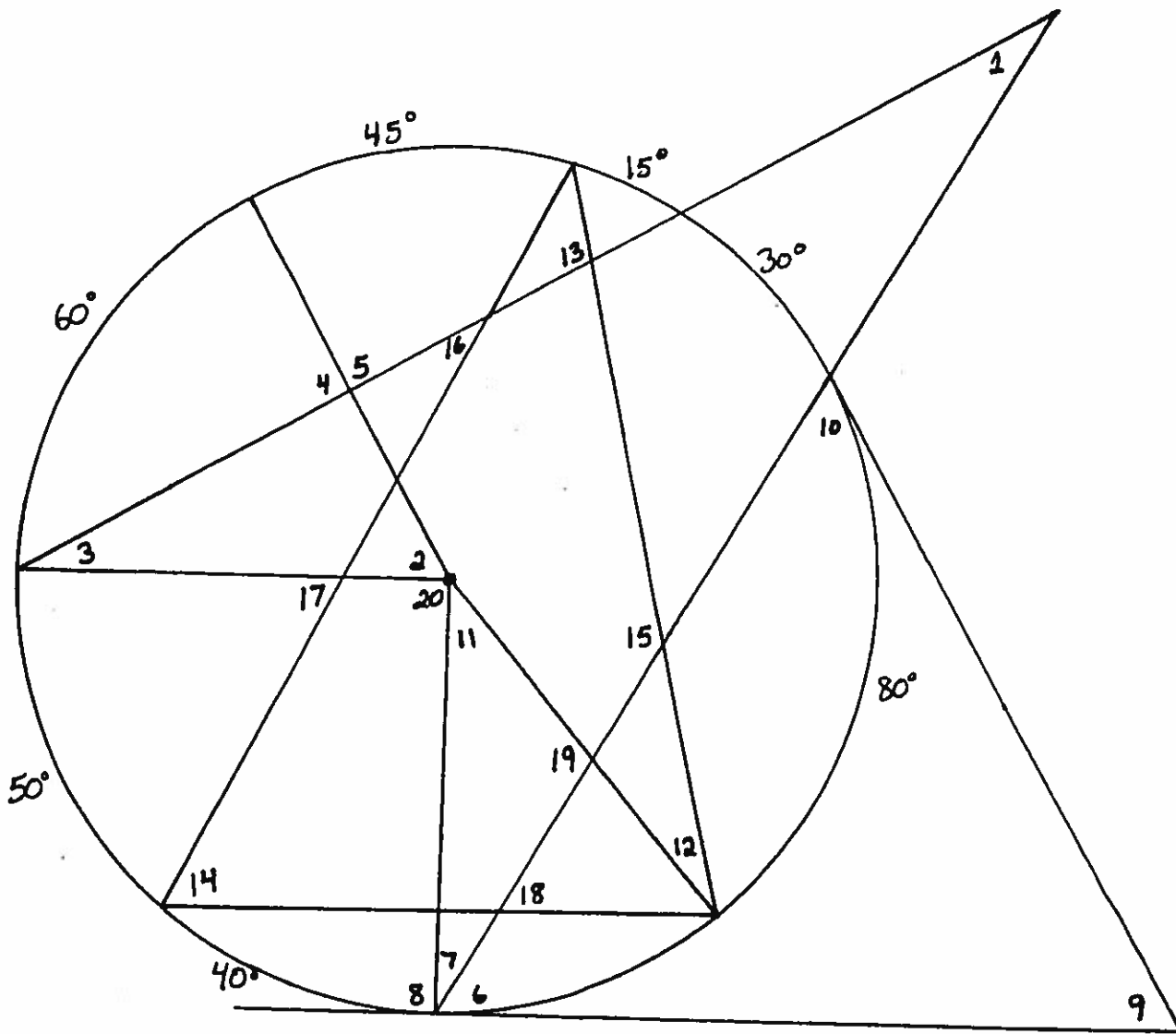
PAP Geometry Warm up Circles

Warning: Not to scale!



In $\odot O$
 $\widehat{BC} = 80$
 $\widehat{CD} = 70$
 $\widehat{EA} = 30$

- Find :
- $m\angle 1 =$ _____
 - $m\angle 2 =$ _____
 - $m\angle 3 =$ _____
 - $m\angle 4 =$ _____
 - $m\angle 5 =$ _____
 - $m\angle 6 =$ _____
 - $m\angle 7 =$ _____
 - $m\angle 8 =$ _____
 - $m\angle 9 =$ _____
 - $m\angle 10 =$ _____
 - $m\angle 11 =$ _____
 - $m\angle 12 =$ _____



$m\angle 1 =$ _____

$m\angle 11 =$ _____

$m\angle 2 =$ _____

$m\angle 12 =$ _____

$m\angle 3 =$ _____

$m\angle 13 =$ _____

$m\angle 4 =$ _____

$m\angle 14 =$ _____

$m\angle 5 =$ _____

$m\angle 15 =$ _____

$m\angle 6 =$ _____

$m\angle 16 =$ _____

$m\angle 7 =$ _____

$m\angle 17 =$ _____

$m\angle 8 =$ _____

$m\angle 18 =$ _____

$m\angle 9 =$ _____

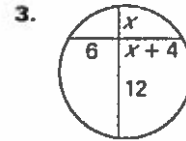
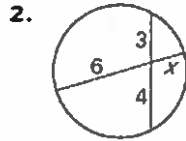
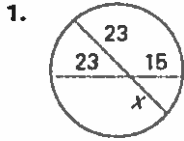
$m\angle 19 =$ _____

LESSON
10.6

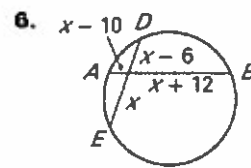
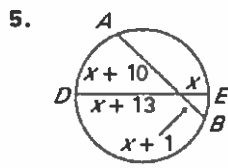
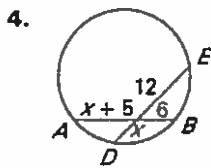
Practice

For use with pages 688-695

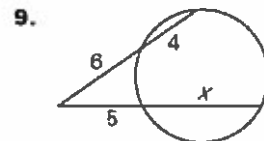
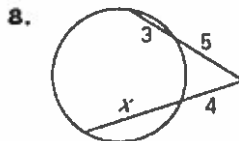
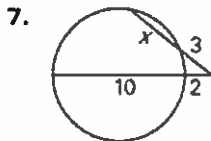
Find the value of x .



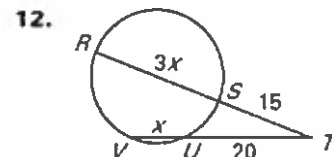
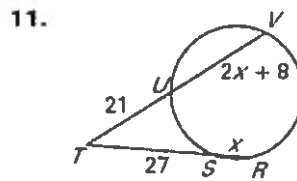
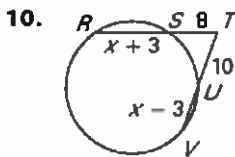
Find AB and DE .



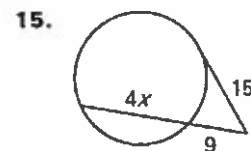
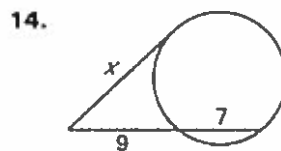
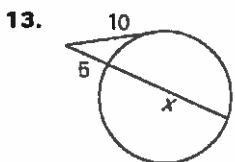
Find the value of x .



Find RT and TV .



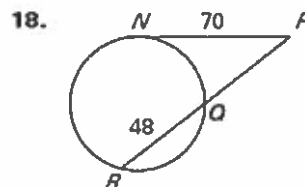
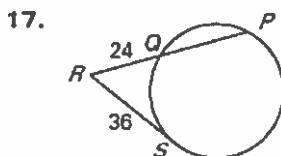
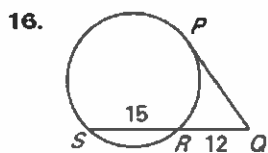
Find the value of x .



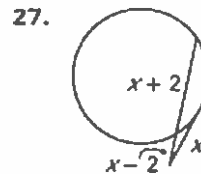
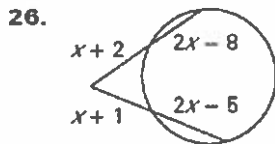
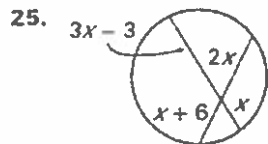
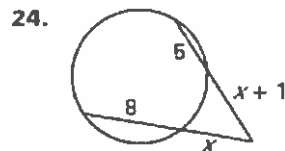
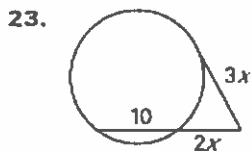
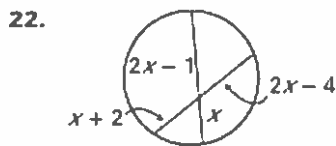
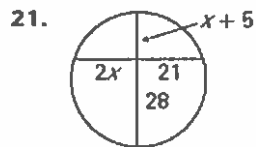
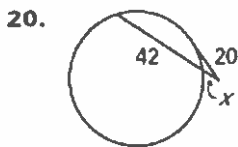
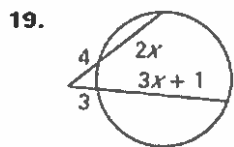
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LESSON 10.6 **Practice** *continued*
For use with pages 688-695

Find PQ .



Find the value of x .



Circles in the Coordinate Plane

Write an equation of a circle with diameter \overline{AB} .

27. $A(0, 0), B(-6, 8)$

28. $A(0, -1), B(2, 1)$

29. $A(7, 5), B(-1, -1)$

30. **Reasoning** Circles in the coordinate plane that have the same center and congruent radii are identical. Circles with congruent radii are congruent. In (a) through (g), circles lie in the coordinate plane.

- Two circles have equal areas. Are the circles congruent?
- Two circles have circumferences that are equal in length. Are the circles congruent?
- How many circles have an area of $36\pi \text{ m}^2$?
- How many circles have a center of $(4, 7)$?
- How many circles have an area of $36\pi \text{ m}^2$ and center $(4, 7)$?
- How many circles have a circumference of $6\pi \text{ in.}$ and center $(4, 7)$?
- How many circles have a diameter with endpoints $A(0, 0)$ and $B(-6, 8)$?

Identify the center and radius of each circle:

31. $x^2 + 2x + y^2 - 6y = -1$

32. $x^2 - 4x + y^2 = 12$

33. $y^2 = 24 - x^2 - 10x$

34. $y^2 - 4y + 1 + x^2 + 2x = 21$

Circles in the Coordinate Plane

Find the center and radius of each circle.

1. $x^2 + y^2 = 36$

2. $(x - 2)^2 + (y - 7)^2 = 49$

3. $(x + 1)^2 + (y + 6)^2 = 16$

4. $(x + 3)^2 + (y - 11)^2 = 12$

Write the standard equation of each circle.

5. center $(0, 0)$; $r = 7$

6. center $(4, 3)$; $r = 8$

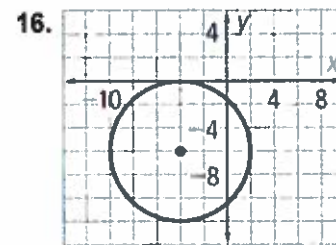
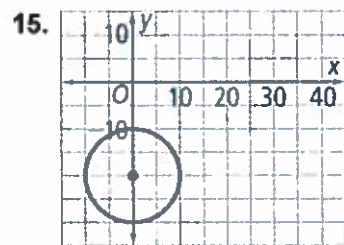
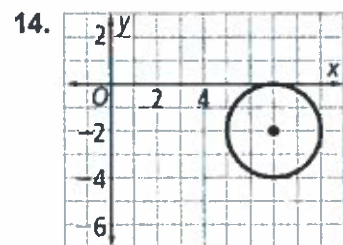
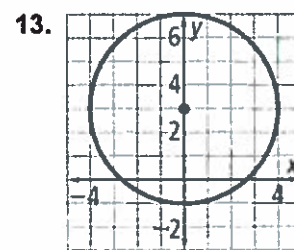
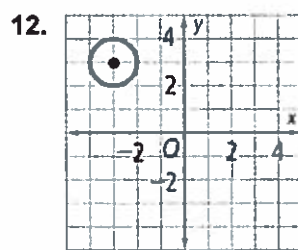
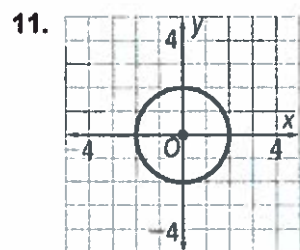
7. center $(5, 3)$; $r = 2$

8. center $(-5, 4)$; $r = \frac{1}{2}$

9. center $(-2, -5)$; $r = \sqrt{2}$

10. center $(-1, 6)$; $r = \sqrt{5}$

Write the standard equation of each circle.



Find the center and radius of each circle. Then graph the circle.

17. $x^2 + y^2 = 25$

18. $(x - 3)^2 + (y - 5)^2 = 9$

19. $(x + 2)^2 + (y + 4)^2 = 16$

20. $(x + 1)^2 + (y - 1)^2 = 36$

Write the standard equation of the circle with the given center that passes through the given point.

21. center $(0, 0)$; point $(3, 4)$

22. center $(5, 9)$; point $(2, 9)$

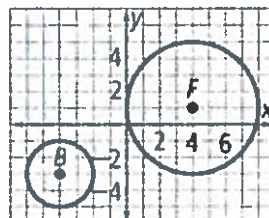
23. center $(-4, -3)$; point $(2, 2)$

24. center $(7, -2)$; point $(-1, -6)$

Write the standard equation of each circle in the diagram at the right.

25. $\square B$

26. $\square F$



— Arc Length

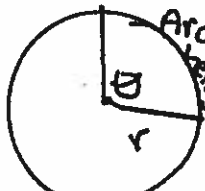
$$\frac{\angle}{360} = \frac{\text{Arc length}}{\text{Circumference}}$$

↑
 $2\pi r$ or πD

— Sector Area

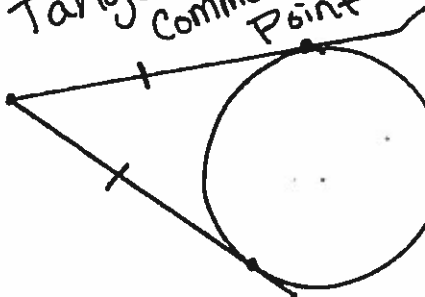
$$\frac{\angle}{360} = \frac{\text{sector}}{\pi r^2}$$

— Radian Measure

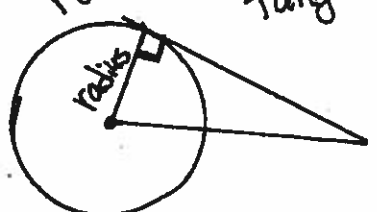


Rad = $\frac{\text{Arc length}}{\text{radius}}$

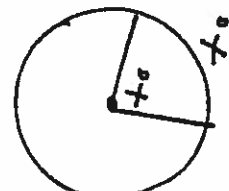
— Tangent with Common external Point



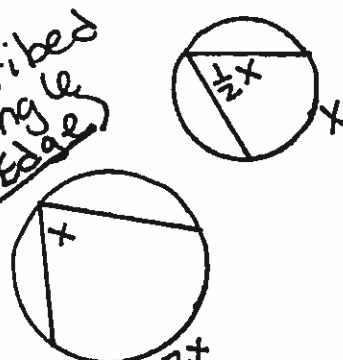
— Tangent line and radius make right \angle .



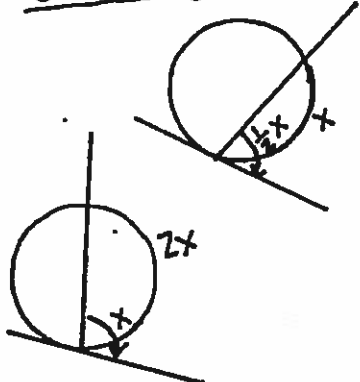
— Central Angle



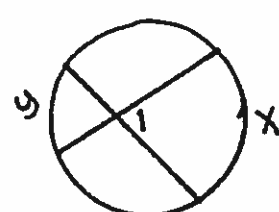
— Inscribed Angle (on Edge)



— on Edge

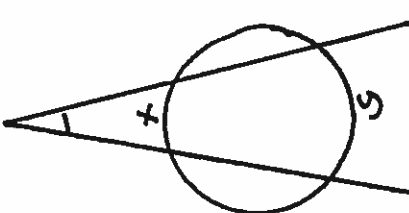


— "Middleish"



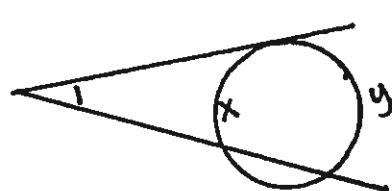
$$m\angle = \frac{x+y}{2}$$

— outside 2 secants



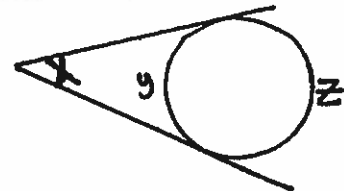
$$m\angle = \frac{y-x}{2}$$

— outside Tangent & secant



$$m\angle = \frac{y-x}{2}$$

— outside 2 tangents



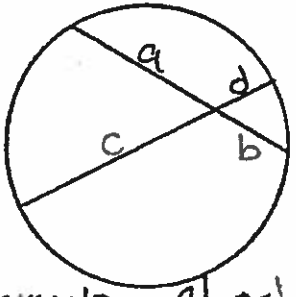
$$x = \frac{z-y}{2}$$

* $X + y = 180^\circ$
only for "Eiffel Tower"

Circle formulas pg 2

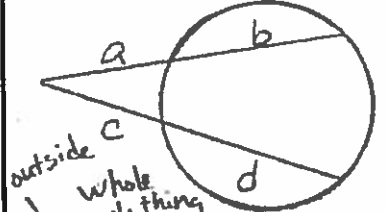
Name _____ Date _____ HW# _____ Page _____ Probs. _____

_____ $a \cdot b = c \cdot d$



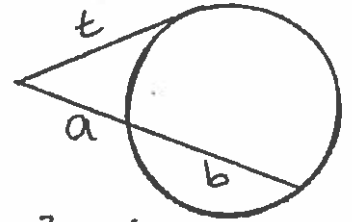
intersecting chords

_____ 2 secants



outside \downarrow whole \downarrow thing
 $a(a+b) = c(c+d)$

_____ Tangent & secant



$$t^2 = a(a+b)$$

_____ Equation of Circle

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

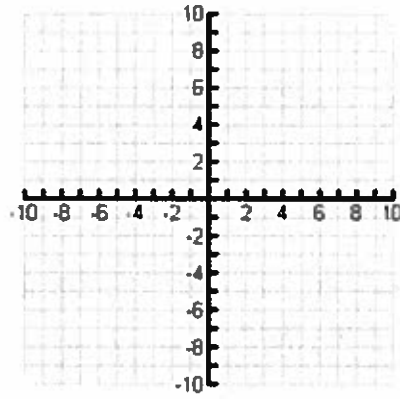
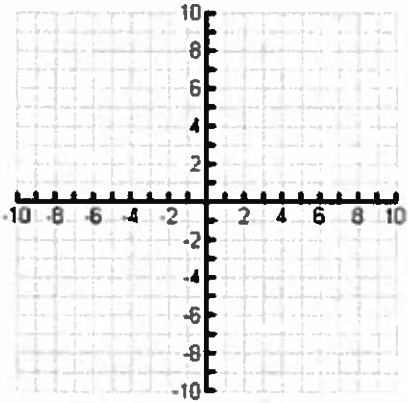
(h, k) center
 $r = \text{radius}$

PAP Circle Review

Graph each circle whose equation is given. Label the center and measure the radius on each graph.

1. $(x - 2)^2 + y^2 = 6.25$

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

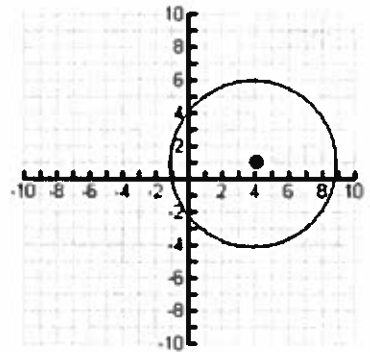


Write the equation of the circle P based on the given information.

3. Center: $P(0, \frac{1}{2})$
Point on circle $(0, 8)$

4. Center: $P(-5.3, 1)$
diameter: 9

5.



6. $x^2 + 4x + y^2 - 6y = 12$

7. $y^2 - 2x + 8y + x^2 = 19$

8. Center $(1, 2)$ point on circle $(4, 6)$

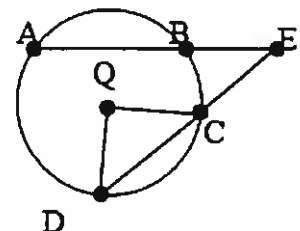
Assume that lines that appear to be tangents are tangents. In circle Q, $m\angle CQD = 120^\circ$, $m(\text{arc}BC) = 30^\circ$ and $m\angle BEC = 25^\circ$. Find each measure.

9. $m(\text{arc}DC)$

10. $m(\text{arc}AD)$

11. $m(\text{arc}AB)$

12. $m(\text{arc}QDC)$



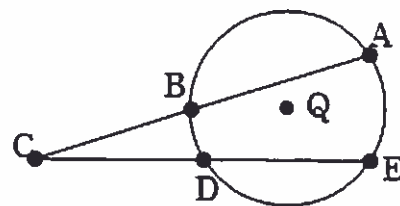
In circle Q, $m(\text{arc}AE) = 140^\circ$, $m(\text{arc}BD) = y$, $m(\text{arc}AB) = 2y$, and $m(\text{arc}DE) = 2y$. Find each measure.

13. $m(\text{arc}BD)$

14. $m(\text{arc}AB)$

15. $m(\text{arc}DE)$

16. $m\angle BCD$



In circle P, $m(\text{arc}BC) = 4x - 50$, $m(\text{arc}DE) = x + 25$, $m(\text{arc}EF) = x - 15$, $m(\text{arc}CD) = x$, and $m(\text{arc}FB) = 50$. Find each measure.

17. $m\angle A$

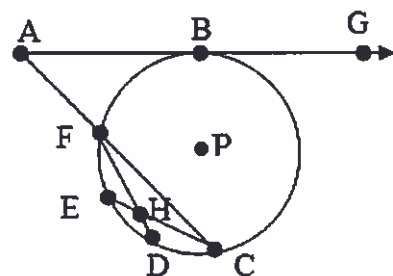
18. $m\angle BCA$

19. $m\angle ABC$

20. $m\angle GBC$

21. $m\angle FHE$

22. $m\angle CFD$

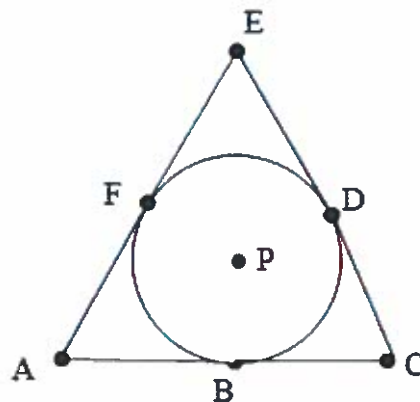


In Circle P, $m\angle A = 62^\circ$ and $m(\text{arc}BD) = 120^\circ$. Find each measure.

23. $m\angle C$

24. $m(\text{arc}DF)$

25. $m\angle E$



In circle P, $m(\text{arc}AB) = x$ and $m(\text{arc}BC) = 3x$. Find each measure.

26. $m(\text{arc}ADC)$

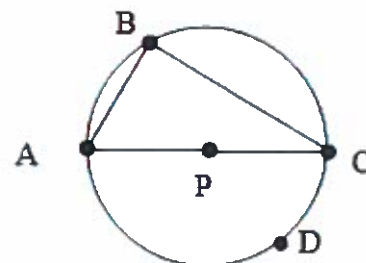
27. $m\angle ABC$

28. $m(\text{arc}AB)$

29. $m\angle A$

30. $m(\text{arc}BC)$

31. $m\angle C$



In circle Q, $m\angle ABC = 72^\circ$, and $m(\text{arc}CD) = 46^\circ$. Find each measure.

32. $m(\text{arc}CA)$

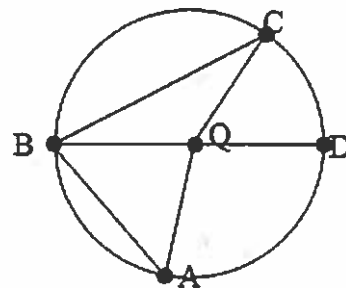
33. $m(\text{arc}BC)$

34. $m(\text{arc}AD)$

35. $m\angle C$

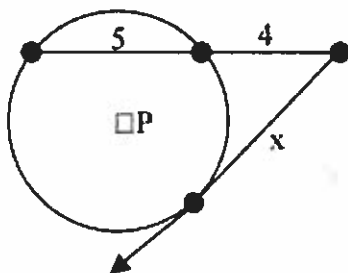
36. $m\angle ABD$

37. $m\angle A$

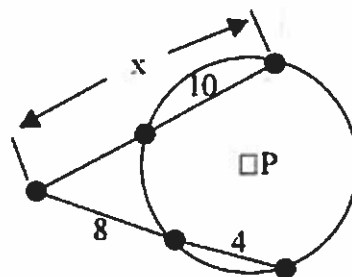


Find the value of x to the nearest tenth. Assume segments that appear to be tangents are tangents.

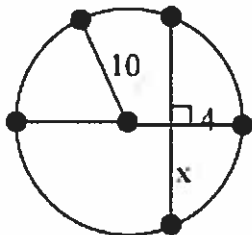
38



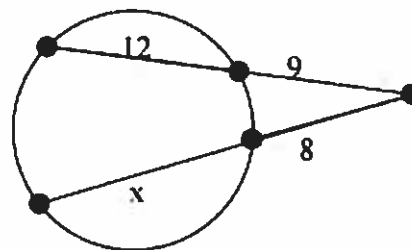
39



40



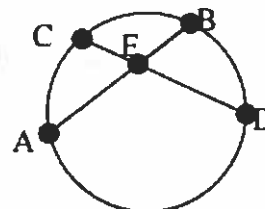
41



In circle P, $CE = 6$, $CD = 16$, $AB = 17$. Find each measure.

42. EB

43. AE

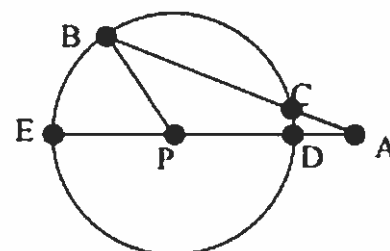


In circle P, $AC = 3$, $BC = 5$, and $AD = 2$. Find each measure.

44. PD

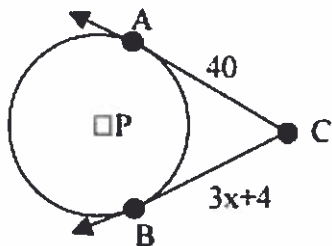
45. ED

46. PB

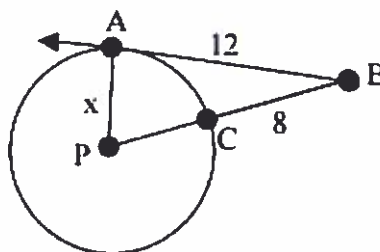


For each circle P, find the value of x. Assume that segments that appear to be tangent are tangent.

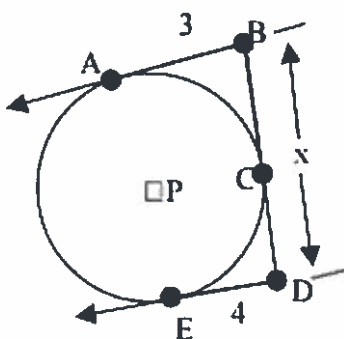
47



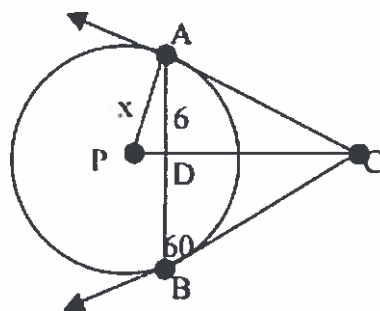
48



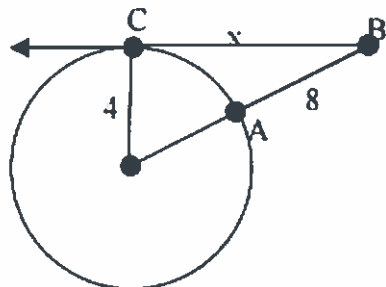
49



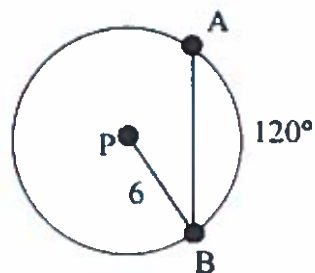
50



51

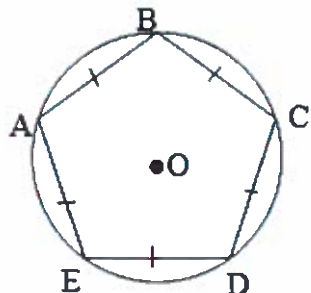


52. Find (arc)AB

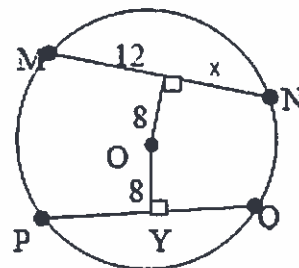


In each figure, O is the center. Find each measure to the nearest tenth.

53. $m(\text{arc})BC$



54

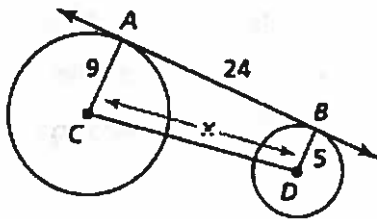


55. Suppose a chord of a circle is 16 inches long and is 6 inches from the center of the circle. Find the length of a radius.

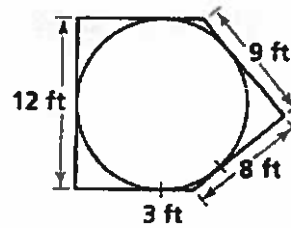
56. Find the length of a chord that is 5 inches from the center of a circle radius of 13 inches.

57. Suppose a radius of a circle is 17 units and a chord is 30 units long. Find the distance from the center of the circle to the chord.

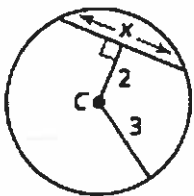
58. Find x



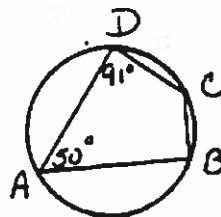
59. Find the perimeter:



60.



61.



$$m\angle B = \underline{\hspace{2cm}}$$

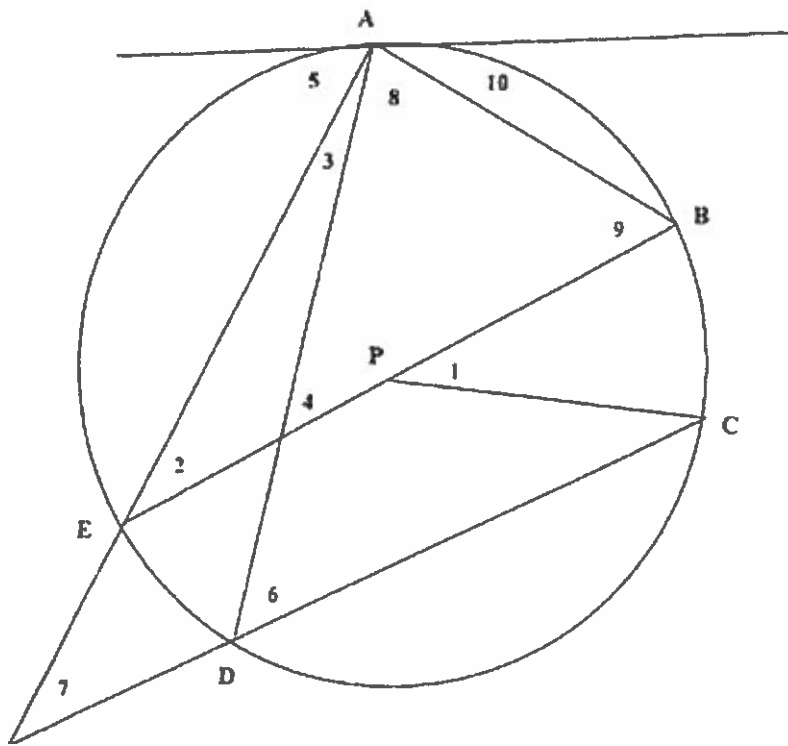
$$m\angle C = \underline{\hspace{2cm}}$$

$$m\widehat{BD} = \underline{\hspace{2cm}}$$

$$m\widehat{ABC} = \underline{\hspace{2cm}}$$

$$m\widehat{DAB} = \underline{\hspace{2cm}}$$

Given: Circle P, $\overset{\frown}{m AB} = 60$ $\overset{\frown}{m BC} = 30$ $\overset{\frown}{m ED} = 20$



$m \angle 1 = \underline{\hspace{2cm}}$

$m \angle 2 = \underline{\hspace{2cm}}$

$m \angle 3 = \underline{\hspace{2cm}}$

$m \angle 4 = \underline{\hspace{2cm}}$

$m \angle 5 = \underline{\hspace{2cm}}$

$m \angle 6 = \underline{\hspace{2cm}}$

$m \angle 7 = \underline{\hspace{2cm}}$

$m \angle 8 = \underline{\hspace{2cm}}$

$m \angle 9 = \underline{\hspace{2cm}}$

$m \angle 10 = \underline{\hspace{2cm}}$