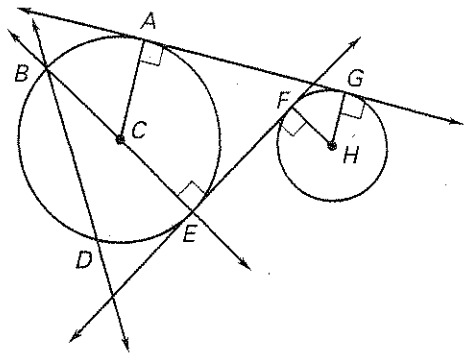
Adv. Geometry 10.1 key

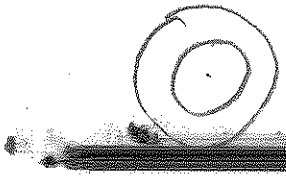
State the best term for the given figure in the diagram.

1. F Point of Tangency
2. $\overleftrightarrow{FE}$ Tangent Line
3. $\overline{HG}$ radius
4. $\overline{DB}$ chord
5. C Center of circle
6. $\overline{BE}$ diameter
7. $\overleftrightarrow{DB}$ Secant
8. $\overleftrightarrow{AG}$ Tangent Line

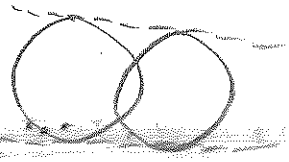


Draw a pair of circles with the characteristics described.

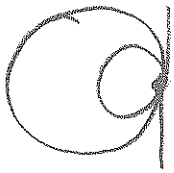
13. non-intersecting circles, no common tangents



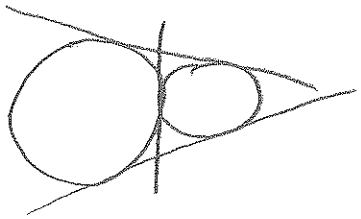
14. intersecting circles, 2 common tangents



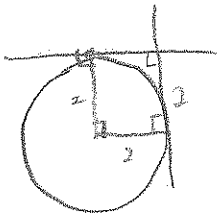
15. 1 point of intersection, 1 common tangent



16. 1 point of intersection, 3 common tangents



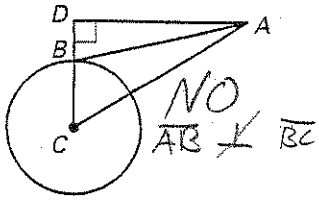
5. Consider a circle with radius 2. Two radii are drawn at right angles to each other. A tangent is drawn at each of the points where the radii intersect the circle. How far from the center of the circle do the tangent lines intersect?



$2\sqrt{2}$

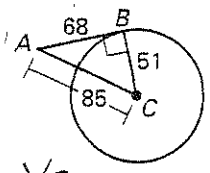
In the diagram, $\overline{BC}$ is a radius of $\odot C$. Determine whether $\overline{AB}$ is tangent to $\odot C$. *Explain* your reasoning.

17.



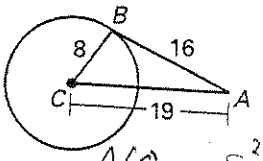
NO
$\overline{AB} \not\perp \overline{BC}$

18.



Yes $68^2+51^2=85^2$

19.

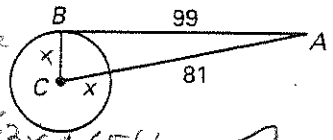


NO, $8^2+16^2 \neq 19^2$

In the diagram, assume that segments are tangents if they appear to be. Find the value(s) of *x*.

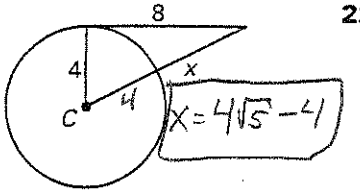
$4^2+8^2=(x+4)^2$

20.



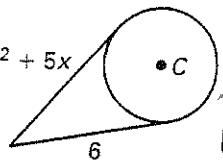
$(x+99)^2 = x^2+99^2$
$x^2+198x+9801 = x^2+9801+162x$
$36x = 162x$
$3240 = 162x$
$x = 20$

21.



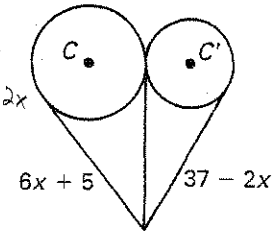
$x = 4\sqrt{5}-4$

22.



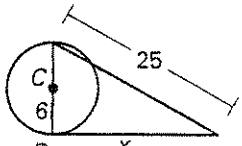
$4x^2+5x = 6$
$4x^2+5x-6 = 0$
$(4x-3)(x+2) = 0$
$x = \frac{3}{4}$ or $x = -2$

23.



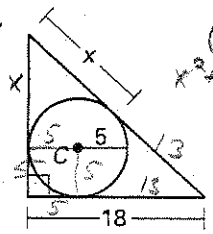
$6x+5 = 37-2x$
$8x = 32$
$x = 4$

24.



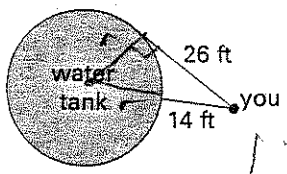
$x^2+12^2 = 25^2$
$x^2 = 625-144$
$x = \sqrt{481} \approx 21.93$

25.



$(x+5)^2+18^2 = (x+13)^2$
$x^2+10x+25+324 = x^2+26x+169$
$180 = 16x$
$\frac{180}{16} = \frac{16x}{16}$
$\frac{45}{4} = x$

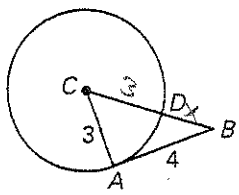
26. Water Tank You are standing 14 feet from the edge of a cylindrical water tank and 26 feet from a point of tangency. The tank is 10 feet tall. What is the volume of the tank in cubic feet? $V = \pi r^2 h$



$r^2+26^2 = (r+14)^2$
$r^2+26^2 = r^2+28r+14^2$
$26^2-14^2 = 28r$
$480 = 28r$
$r = 17.1428$

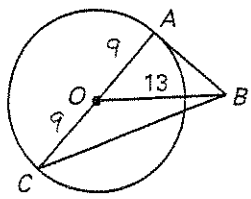
$V = \pi(17.1428)^2(10) \approx 9232.44 \text{ ft}^3$

1. In the figure at the right, $\overline{AB}$ is tangent to circle C. Find the length of $\overline{DB}$.



$3^2+4^2 = (3+x)^2$
$9+16 = (3+x)^2$
$\sqrt{25} = \sqrt{(3+x)^2}$
$5 = 3+x$
$2 = x$

2. In the figure at the right, $OB = 13$ and $\overline{AB}$ is tangent to $\odot O$, whose diameter $\overline{AC}$ has length 18. Find BC.



$9^2+(AB)^2 = 13^2$
$81+(AB)^2 = 169$
$-81 \quad -81$
$(AB)^2 = 88$
$AB = \sqrt{88}$

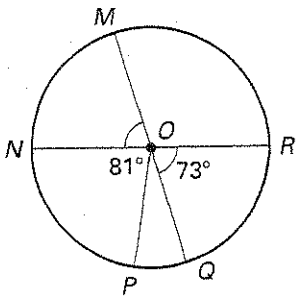
$18^2+(\sqrt{88})^2 = (BC)^2$
$324+88 = (BC)^2$
$412 = (BC)^2$
$\sqrt{412} = BC$
or
$2\sqrt{103}$

$\begin{array}{r} 6 \\ 18 \\ 18 \\ \hline 144 \\ 180 \\ \hline 324 \end{array}$

Adv. Geometry 10.2 Key

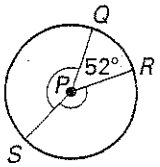
$\overline{MQ}$ and $\overline{NR}$ are diameters of $\odot O$. Determine whether the given arc is a *minor arc*, *major arc*, or *semicircle*. Then find the measure of the arc.

1. $\overset{\frown}{MN}$ - Minor = 73°
2. $\overset{\frown}{NQ}$ - Minor = 107°
3. $\overset{\frown}{NQR}$ - Semicircle 180°
4. $\overset{\frown}{MRP}$ - Major 206°
5. $\overset{\frown}{PN}$ - Minor 81°
6. $\overset{\frown}{MNQ}$ - Semicircle 180°
7. $\overset{\frown}{QR}$ - Minor 73°
8. $\overset{\frown}{MR}$ - Minor 107°
9. $\overset{\frown}{QMR}$ - Major 287°
10. $\overset{\frown}{PQ}$ - Minor 26°
11. $\overset{\frown}{PRN}$ - Major 279°
12. $\overset{\frown}{MQN}$ - Major 287°

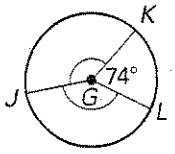


Find the indicated arc measure.

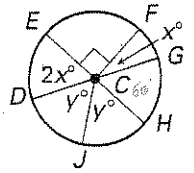
13. $m\overset{\frown}{QS}$ = 154°



14. $m\overset{\frown}{LKJ}$ = 217°

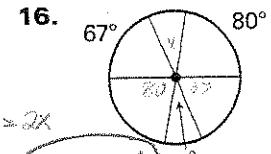


15. $m\overset{\frown}{DH}$ = 120°



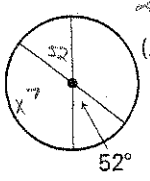
Find the value of *x*.

16.



X = 33°

17.

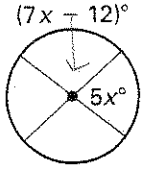


$2x^7 = 256$

$x^7 = 128$

X = 2

18.



$360 = 5x + 5x + (7x - 12) + 7x - 12$

$360 = 24x - 24$

$\frac{384}{24} = \frac{24x}{24}$

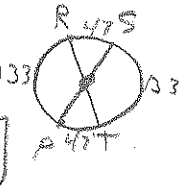
X = 16

$\overline{AC}$ and $\overline{BD}$ are diameters of $\odot E$. Find the measure of the given arc if $m\overset{\frown}{ACD}$ = 316°.

19. $m\overset{\frown}{AD}$ = 44°
20. $m\overset{\frown}{BC}$ = 44°
21. $m\overset{\frown}{BCA}$ = 224°
22. $m\overset{\frown}{DCB}$ = 180°

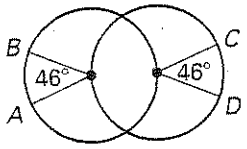
$\overline{RT}$ and $\overline{PS}$ are diameters of $\odot N$. Find the measure of the given arc if $m\overset{\frown}{TP}$ = 47°.

23. $m\overset{\frown}{ST}$ = 133°
24. $m\overset{\frown}{PR}$ = 133°
25. $m\overset{\frown}{RTP}$ = 227°
26. $m\overset{\frown}{STR}$ = 313°



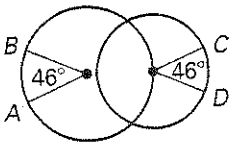
Tell whether $\overset{\frown}{AB} \cong \overset{\frown}{CD}$. *Explain.*

27.



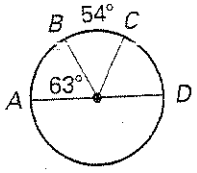
Yes, ≅ ⊙ & ≅ ∡

28.



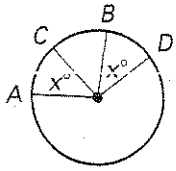
No, ⊙'s not ≅

29.



Yes, same ⊙ & 63° for both arcs

30.



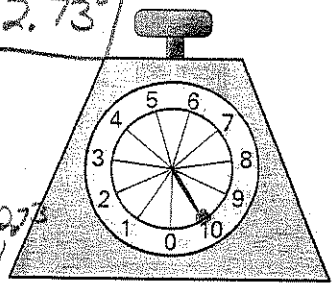
yes $\overset{\frown}{AB} = \overset{\frown}{AC} + \overset{\frown}{CB}$

$\overset{\frown}{CD} = \overset{\frown}{BD} + \overset{\frown}{CB}$

Arc addition Postulate

In Exercises 31–35, use the following information.

Game Timer The device shown is a 10-second game timer. The top plunger button alternatively stops and starts the timer. For game play, the timer is started at 10 (as shown) and moves counterclockwise. Players often start and stop the timer several times before it reaches 0. Give all answers to the nearest tenth.



31. What is the measure of the arc traced out by the tip of the pointer as it moves from one number to the next on the timer? $\frac{360}{11} \approx 32.73°$

32. What is the measure of the arc traced out as the pointer moves from the 10 to the 0? $327.27°$

33. A player starts the timer at the 10 and stops it after 3.4 seconds. What is the measure of the arc generated? Each second is $\frac{327.27}{10} = 32.73$

$32.73 \cdot 3.4 \approx 111.27°$

34. A player stops the timer after 2.3 seconds, then after 1.2 seconds, and again after 2.5 seconds. What is the sum of the measures of the arcs?

Total arc = 6 seconds

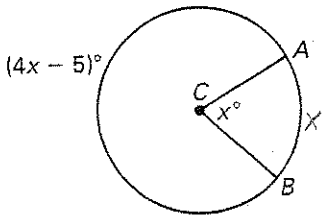
$6 \cdot 32.73 = 196.38°$

35. How much time does it take the pointer to trace out an arc of 60°?

$\frac{60}{32.73} \approx 1.83$ sec

In Exercises 8–10, *C* is the center of the circle. Find the possible values of *x*.

8.

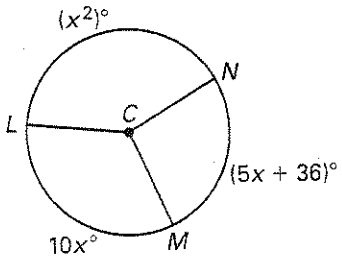


$4x - 5 + x = 360$

$5x = 365$

$x = 73$

9.



$x^2 + 10x + 5x + 36 = 360$

$x^2 + 15x - 324 = 0$

$(x + 27)(x - 12) = 0$

$x + 27 = 0$ $\quad$ $x - 12 = 0$

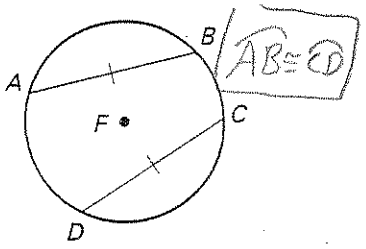
$x = -27$ $\quad$ $x = 12$

10.3 Adv. Geometry

Key

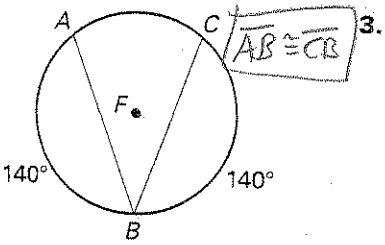
What can you conclude about the diagram? ~~State a postulate or theorem that justifies your answer.~~

1.



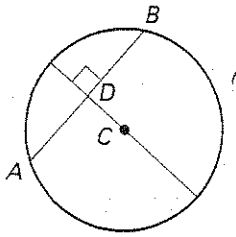
$\overline{AB} \cong \overline{CD}$

2.



$\overline{AB} \cong \overline{CB}$

3.

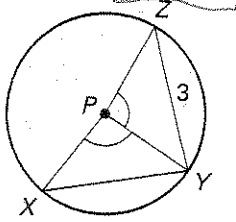


$\overline{AD} \cong \overline{BD}$

***P* is the center of the circle. Use the given information to find *XY*.**

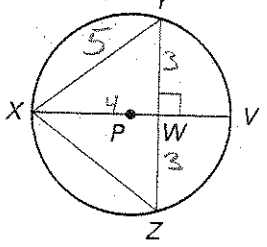
4. $ZY = 3$

$XY = 3$



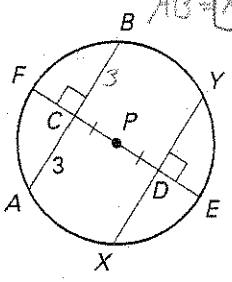
5. $ZY = 6,\ XW = 4$

$XY = 5$



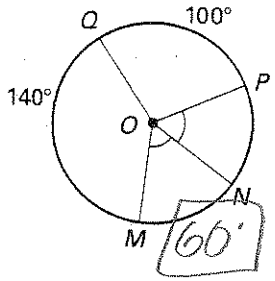
6. $CA = 3$

$AB = XY = 6$

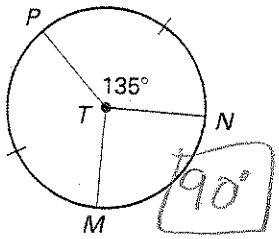


Find the measure of $\overset{\frown}{MN}$.

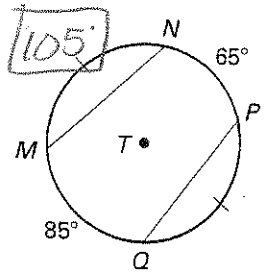
7.



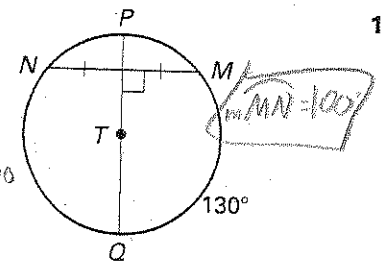
8.



9.

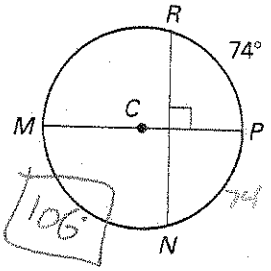


10.

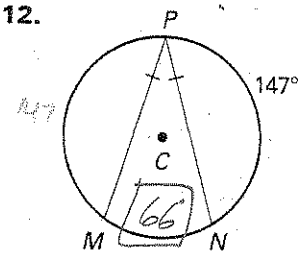


$m\overset{\frown}{MN} = 100°$

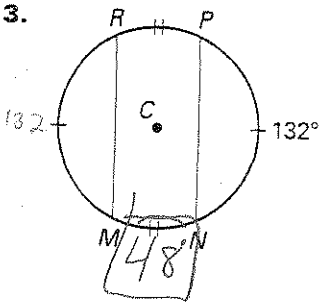
11.



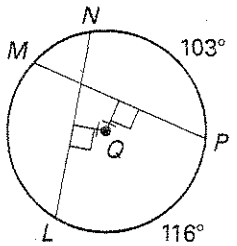
12.



13.



14.



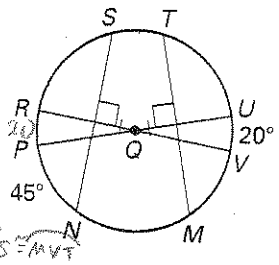
$\overline{MP} \cong \overline{NL} \rightarrow \overset{\frown}{NL} \cong \overset{\frown}{MP}$

$m\angle MPL = 219° \rightarrow m\overset{\frown}{NL} = 141 \rightarrow$

$m\overset{\frown}{MP} = 141$

$m\overset{\frown}{MN} = 38°$

15.



$\overline{SN} \cong \overline{TM}$

$m\overset{\frown}{NV} = 115°$

$\overset{\frown}{NPS} \cong \overset{\frown}{MVT}$

$\overset{\frown}{SR} \cong \overset{\frown}{RN} \cong \overset{\frown}{TU} \cong \overset{\frown}{UM}$

$m\overset{\frown}{UM} = 65°$

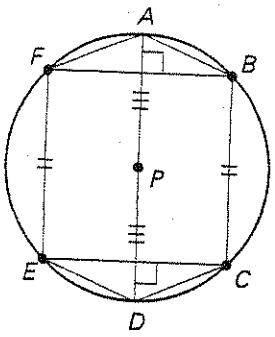
$m\overset{\frown}{PU} = 180°$

$m\overset{\frown}{MN} = 180 - 45 - 65 = 70°$

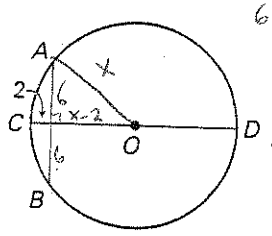
Use the figure to match the chord or arc with a congruent arc or chord.

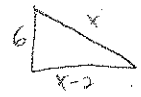
16. $\overset{\frown}{FB}$ C
17. $\overline{AF}$ D
18. $\overset{\frown}{BC}$ A
19. $\overline{EC}$ E
20. $\overset{\frown}{DC}$ B
21. $\overline{PD}$ F

A. $\overset{\frown}{FE}$
B. $\overset{\frown}{ED}$
C. $\overset{\frown}{EC}$
D. $\overline{AB}$
E. $\overline{BF}$
F. $\overline{PA}$



1. In the diagram below, $\overline{CD}$ is a diameter of $\odot O$ and is perpendicular to $\overline{AB}$. If $AB = 12$ and $CX = 2$, what is the radius of $\odot O$?





$6^2 + (x-2)^2 = x^2$

$36 + x^2 - 4x + 4 = x^2$

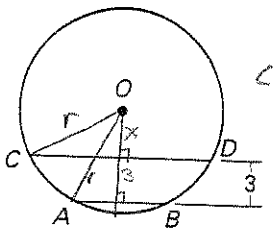
$-x^2 \quad -x^2$

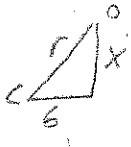
$40 - 4x = 0$

$40 = 4x$

$10 = x$

2. In the diagram below, $\overline{AB}$ and $\overline{CD}$ are two parallel chords of $\odot O$. If $AB = 6$, $CD = 12$ and the distance between these chords is 3, what is the radius of $\odot O$?





$r^2 = x^2 + 6^2$

$r^2 = 3^2 + (x+3)^2$

$r^2 = 3^2 + 6^2$

$9 + 36$

$r^2 = 45$

$r = \sqrt{45}$

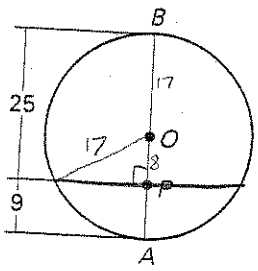
$x^2 + 36 = 9 + x^2 + 6x + 9$

$-x^2 \quad -x^2 \quad -9$

$36 - 18 = 6x$

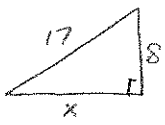
$3 = x$

6. $\overline{AB}$ is a diameter of a $\odot O$ as shown below. P is a point such that $PA = 9$ and $PB = 25$. Find the length of the shortest chord through point P.



$AB = 34$

radius $= 17$



$x^2 + 8^2 = 17^2$

$x^2 = 225$

$x = 15$

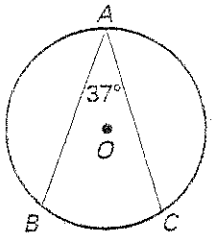
shortest chord $= 30$

Adv. Geometry 10.4 Inscribed Angles

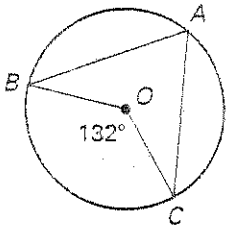
Key

Find the indicated measure.

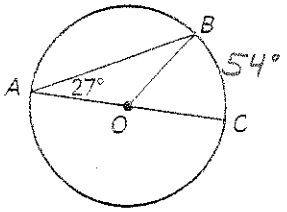
1. $\overset{\frown}{mBC} = 74°$



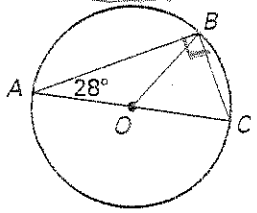
2. $m\angle A = 66°$



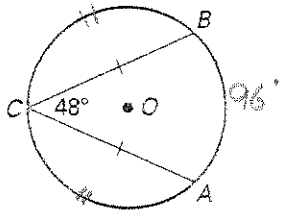
3. $\overset{\frown}{mAB} = 126°$



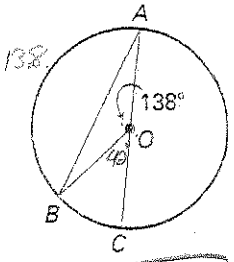
4. $m\angle C = 62°$



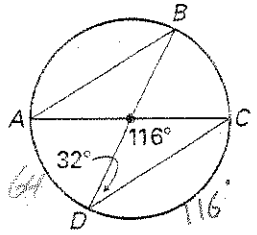
5. $\overset{\frown}{mAC} = 132°$



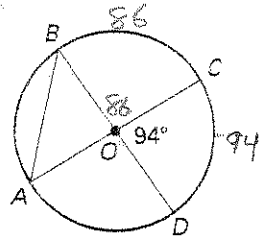
6. $\overset{\frown}{mBC} = 42°$



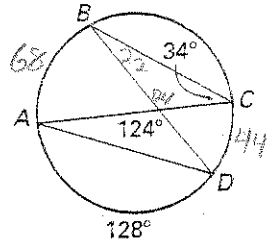
7. $m\angle B = 32°$



8. $m\angle A = 43°$

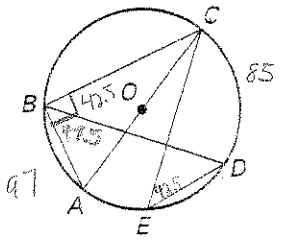


9. $\overset{\frown}{mBC} = 120°$



Find the indicated measure in ⊙O, given $\overset{\frown}{mCD} = 85°$ and $\overset{\frown}{mBE} = 97°$.

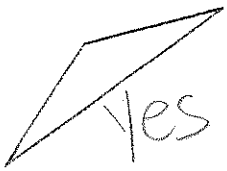
10. $m\angle ABC =$ 90°
11. $m\angle CED =$ 42.5°
12. $m\angle BDE =$ 48.5°
13. $m\angle CBD =$ 42.5°
14. $m\angle ABD =$ 47.5°
15. $m\angle BCE =$ 48.5°
16. $\overset{\frown}{mAD} =$ 95°
17. $\overset{\frown}{mABC} =$ 180°



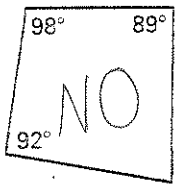
$\overset{\frown}{AD} = 95$

Determine whether a circle can be circumscribed about the figure.

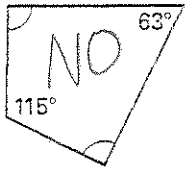
18.



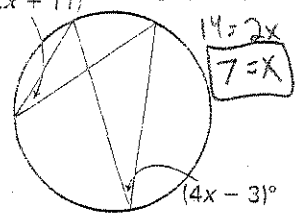
19.



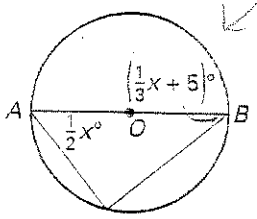
20.



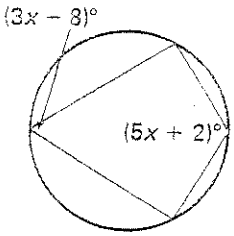
Find the value(s) of the variable(s).

21. 

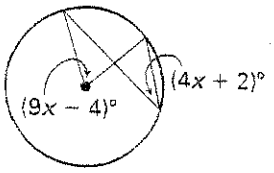
$2x+11=4x-3$
$14=2x$
$7=x$

22. 

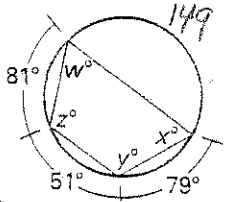
$\frac{5}{6}x = 85$
$\frac{3}{6}x + \frac{2}{6}x = 85$
$\frac{1}{2}x + \frac{1}{3}x + 5 = 90$
$x = 102$

23. 

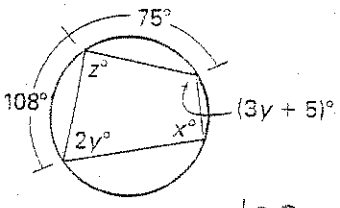
$3x-8+5x+2=180$
$8x-6=180$
$8x=186$
$x=23.25$

24. 

$9x-4=2(4x+2)$
$9x-4=8x+4$
$x=8$

25. 

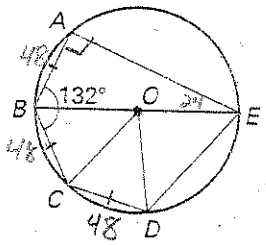
149
$w=65°$
$y=115°$
$x=66°$
$z=114°$

26. 

$2y+3y+5=180$
$5y+5=180$
$5y=175$
$y=35$

$x=91.5$
$z=88.5$

In Exercises 4 and 5, use the figure below which shows a pentagon inscribed in ⊙O. Assume $\overline{AB} \cong \overline{BC} \cong \overline{CD}$ and $m\angle ABC = 132°$.



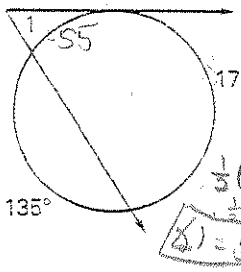
$m\overset{\frown}{AEC} = 264°$
$m\overset{\frown}{AC} = 96°$

4. Find $m\angle AEB$. $= 24°$
5. Find $m\angle COD$. $= 48°$

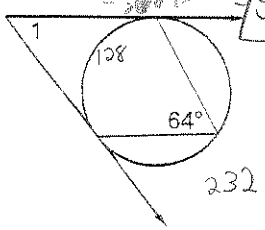
Adv. Geometry 10.5

key

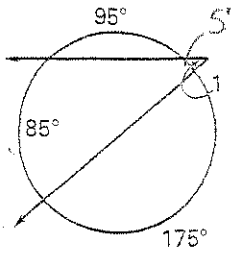
Find the measure of ∠1.

1. 

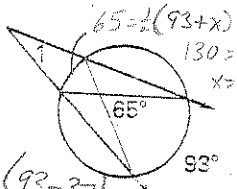
$\frac{1}{2}(170-55)$
$\frac{1}{2}(115)$
$\angle 1 = 57.5$

2. 

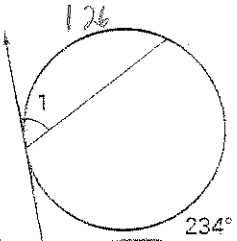
232
$\angle 1 = \frac{1}{2}(232-128)$
$= \frac{1}{2}(104)$
$= 52°$

3. 

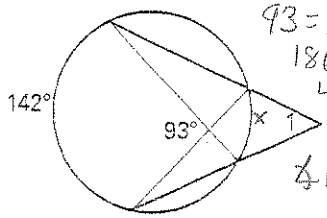
$\angle 1 = \frac{1}{2}(85-5)$
$= 40°$

4. 

$65 = \frac{1}{2}(93+x)$
$130 = 93+x$
$x = 37$
$\angle 1 = \frac{1}{2}(93-37)$
$\frac{1}{2}(56)$
$= 28°$

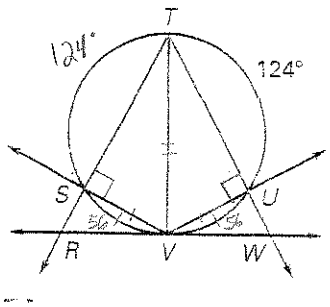
5. 

$\angle 1 = 63°$

6. 

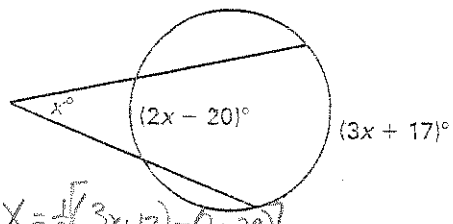
$93 = \frac{1}{2}(142+x)$
$186 = 142+x$
$44 = x$
$\angle 1 = \frac{1}{2}(142-44)$
$\frac{1}{2}(98)$
$49°$

Use the information given in the diagram to find the measure.

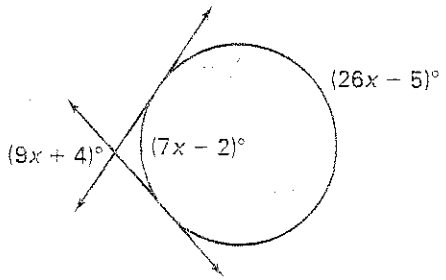


7. $m\overset{\frown}{TV} = 180°$
8. $m\overset{\frown}{SV} = 56°$
9. $m\angle STU = 56°$
10. $m\angle VWU = \frac{1}{2}(180-56) = \frac{1}{2}124 = 62°$

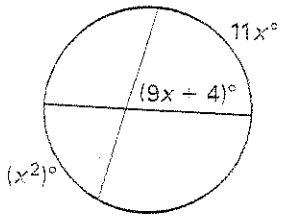
Find the value of x.

11. 

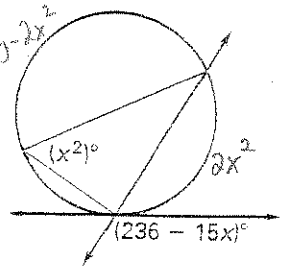
$x = \frac{1}{2}[(3x+17)-(2x-20)]$
$2x = x+37$
$x = 37$

12. 

$9x+4 = \frac{1}{2}((26x-5)-(7x-2))$
$18x+8 = 19x-3$
$11 = x$

13. 

$9x+4 = \frac{1}{2}(x^2+11x)$
$18x+8 = x^2+11x$
$0 = x^2-7x-8$
$0 = (x-8)(x+1)$
$x = 8$ ~~$x = -1$~~

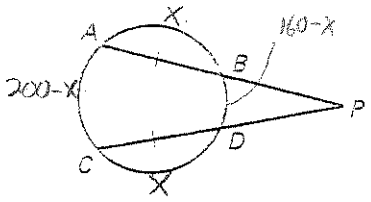
14. 

$236-15x = \frac{1}{2}(360-2x^2)$
$236-15x = 180-x^2$
$x^2-15x+56 = 0$
$(x-7)(x-8) = 0$
$x = 7 \quad x = 8$

Use the given information to find the indicated quantity.

15. GIVEN: $\overline{AB} \cong \overline{CD}$, $m\widehat{ACD} = 200°$

FIND: $m\angle P$



$m\angle P = \frac{1}{2}((200-x)-(160-x))$

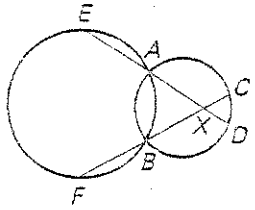
$m\angle P = \frac{1}{2}(40)$

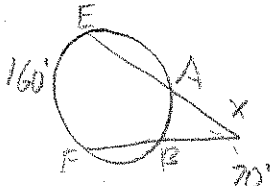
$= 20°$

16. GIVEN: The two circles intersect at A and B;
$m\angle AXB = 70°$, $m\widehat{CD} = 20°$,
$m\widehat{EF} = 160°$

FIND: The difference between the measures of $\widehat{AB}$ of the smaller circle and $\widehat{AB}$ of the larger circle

100°

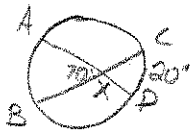




$70 = \frac{1}{2}(160 - \widehat{AB})$

$140 = 160 - \widehat{AB}$

$\widehat{AB} = 20°$

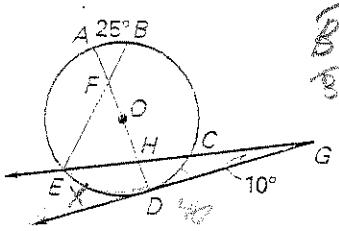


$70° = \frac{1}{2}(\widehat{AB} + 20)$

$140 = \widehat{AB} + 20$

$120 = \widehat{AB}$

1. In the figure below, $\overline{AD}$ is a diameter, $m\widehat{AB} = 25°$, $m\widehat{CD} = 40°$, and $m\angle EGD = 10°$. Find $m\angle AFB$.



$\widehat{BD} = 155°$

$\widehat{BC} = 115°$

$10 = \frac{1}{2}(x - 40)$

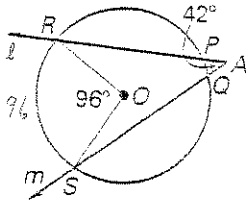
$20 = x - 40$

$60 = x$

$\angle AFB = \frac{1}{2}(25 + 60)$

$= 42.5°$

4. The secants ℓ and m intersect at point A and $\widehat{PQ}$ and $\widehat{RS}$ are the intercepted arcs. If $m\angle PAQ = 42°$ and $m\angle ROS = 96°$, find $m\widehat{PQ}$.



$42 = \frac{1}{2}(96 - \widehat{PQ})$

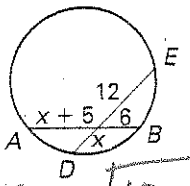
$84 = 96 - \widehat{PQ}$

$12° = \widehat{PQ}$

Adv. Geom 10.6 - Segment Lengths Key

Find *AB* and *DE*.

4.

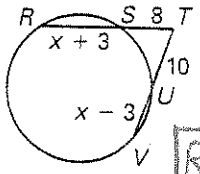


$6(x+5) = 12x$
$6x + 30 = 12x$
$30 = 6x$
$5 = x$

$AB = 16$
$DE = 17$

Find *RT* and *TV*.

10.

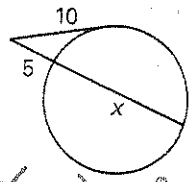


$8(x+1) = 10(x+7)$
$8x + 8 = 10x + 70$
$18 = 2x$
$9 = x$

$RT = 20$
$TV = 16$

Find the value of *x*.

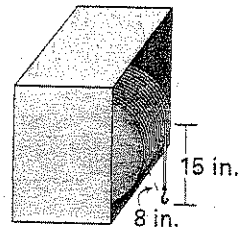
13.



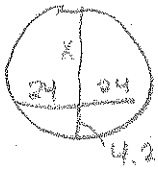
$5(x+5) = 10^2$
$5x + 25 = 100$
$5x = 75$
$x = 15$

28. Winch A large industrial winch is enclosed as shown. There are 15 inches of the cable hanging free off of the winch's spool and the distance from the end of the cable to the spool is 8 inches. What is the diameter of the spool?

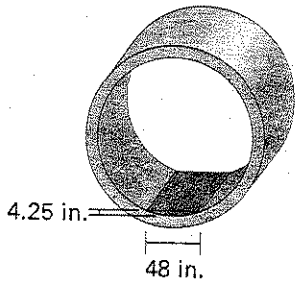
$8(x+8) = 15^2$
$8x + 64 = 225$
$8x = 161$
$x = 20\frac{1}{8}$"



29. Storm Drain The diagram shows a cross-section of a large storm drain pipe with a small amount of standing water. The distance across the surface of the water is 48 inches and the water is 4.25 inches deep at its deepest point. To the nearest inch, what is the diameter of the storm drain pipe?

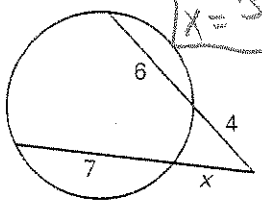


$4.25x = 24.24$
$x = 135.529$
$d = 139.78 \approx 140"$



Find the value of *x*. Round decimal answers to the nearest tenth. Work on Separate sheet

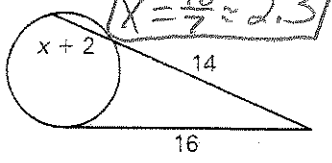
1.



$4 \cdot 10 = x(x+3)$
$40 = x^2 + 3x$
$x^2 + 3x - 40$
$x = \frac{-3 \pm \sqrt{9 + 160}}{2}$

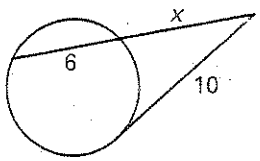
$x = 3.7$

2.



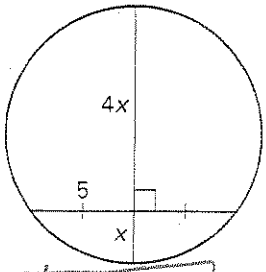
$x = \frac{16}{7} \approx 2.3$

3.



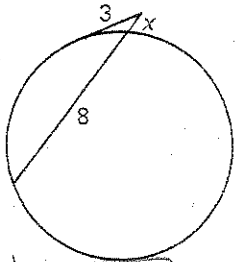
$x = 7.4$

4.



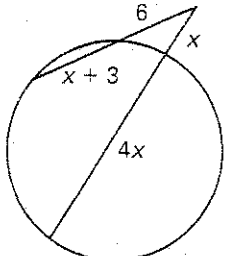
$x = 2.5$

5.



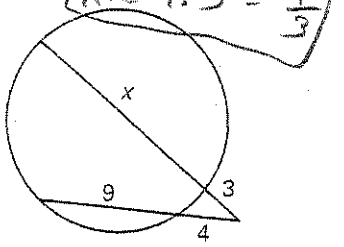
$x = 1$

6.

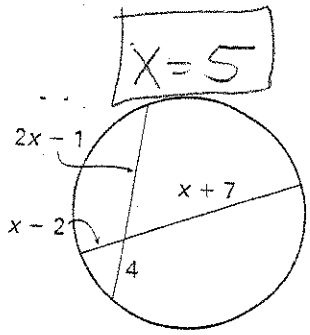


$x = 3.9$

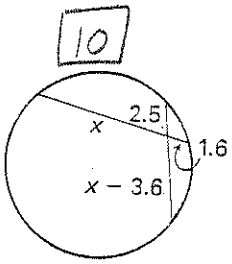
7. $x = 14.3 = \frac{43}{3}$



8. $X = 5$

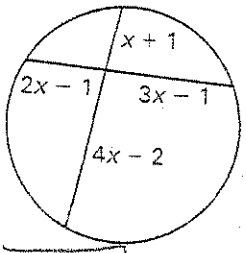


9. 10



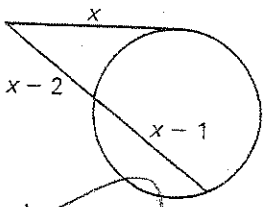
Find all the possible values of x.

10.



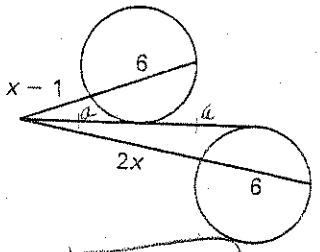
$X = 3$

11.



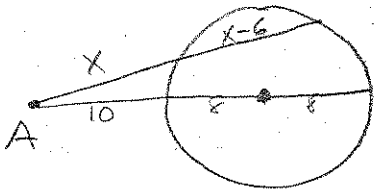
$X = 6$

12.



$X = 5$

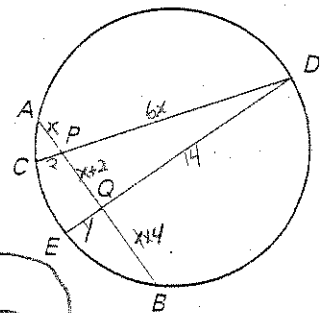
4. Two secant segments meet at point A outside a circle. One secant segment passes through the center of the circle and has an external segment length of 10 centimeters. The external and internal segment lengths of the other secant segment are x and $x - 6$ respectively. Given that the radius of the circle is 8 centimeters, find the value of x.



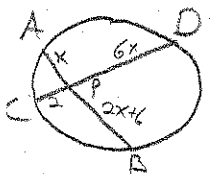
$X(2x-6) = 10(26)$
$2x^2 - 6x = 260$
$2x^2 - 6x - 260 = 0$
$2(x^2 - 3x - 130) = 0$
$2(x-13)(x+10) = 0$

$X = 13$ $x \neq -10$

14. In the figure at the right, let $AP = x$, $PQ = x + 2$, $QB = x + 4$, $CP = 2$, $PD = 6x$, $EQ = y$, and $QD = 14$. Find all the unknown segment lengths.

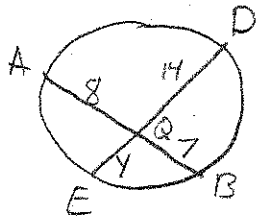


Part 1



$2(2x+6) = 2(6x)$
$2x^2 + 6x = 12x$
$2x^2 - 6x = 0$
$2x(x-3) = 0$
$x \neq 0$ $x = 3$

Part 2



$14y = 8 \cdot 7$
$14y = 56$
$y = 4$

$AP = 3$
$PQ = 5$
$QB = 7$
$PD = 18$
$EQ = 4$

#2 $16^2 = 14(x+16)$

$256 = 14x + 224$

$32 = 14x$

$\frac{32}{14} = x$

$\frac{16}{7} = x$

③ $10^2 = x(x+6)$

$100 = x^2 + 6x$

$0 = x^2 + 6x - 100$

$x = \frac{-6 \pm \sqrt{36 - 4(-100)}}{2}$

$x = \frac{-6 \pm \sqrt{436}}{2}$

$x = 7.4$

④ $4x \cdot x = 5 \cdot 5$

$4x^2 = 25$

$x^2 = \frac{25}{4}$

$x = \pm \frac{5}{2}$

$x = \frac{5}{2}$

⑤ $3^2 = x(x+8)$

$9 = x^2 + 8x$

$0 = x^2 + 8x - 9$

$0 = (x+9)(x-1)$

$x = -9$ $x = 1$

⑥ $x(5x) = 6(x+9)$

$5x^2 = 6x + 54$

$5x^2 - 6x - 54 = 0$

~~$(5x \quad x(x \quad) = 0$~~

$x = \frac{6 \pm \sqrt{36 - 4(5)(-54)}}{10}$

$x = \frac{6 \pm \sqrt{1116}}{10}$

$x = 3.94$

⑦ $4(13) = 3(x+3)$

$52 = 3x + 9$

$43 = 3x$

$\frac{43}{3} = x$

$14.3 \approx x$

⑧ $(x-2)(x+7) = (2x-1)(4)$

$x^2 + 5x - 14 = 8x - 4$

$x^2 - 3x - 10 = 0$

$(x-5)(x+2) = 0$

$x = 5$ ~~$x = -2$~~

⑨ $1.6x = 2.5(x - 3.6)$

$1.6x = 2.5x - 9$

$9 = .9x$

$10 = x$

⑩ $(x+1)(4x-2) = (2x-1)(3x-1)$

$4x^2 + 4x - 2x - 2 = 6x^2 - 3x - 2x + 1$

$+2x \qquad -5x$

$0 = 2x^2 - 7x + 3$

$0 = (2x-1)(x-3)$

~~$x = \frac{1}{2}$~~ $x = 3$

⑪ $x^2 = (x-2)(x-2+x-1)$

$x^2 = (x-2)(2x-3)$

$x^2 = 2x^2 - 4x - 3x + 6$

$0 = x^2 - 7x + 6$

$0 = (x-6)(x-1)$

$x = 6$ ~~$x = 1$~~

⑫ $(x-1)(x+5) = a^2$

$x^2 - x + 5x - 5 = a^2$

$x^2 + 4x - 5 = a^2$

$-x^2 \qquad -x^2$

$4x - 5 = 3x$

$x = 5$

$(2a)^2 = 2x(2x+6)$

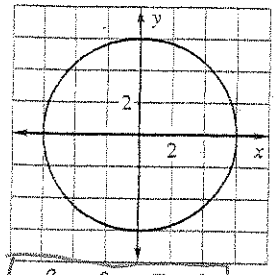
$(4a^2 = 4x^2 + 12x) \frac{1}{4}$

$a^2 = x^2 + 3x$

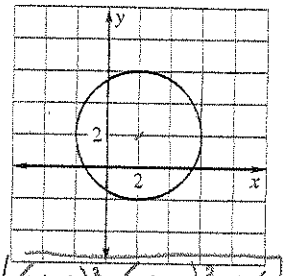
10.7 - Equations of Circles Adv. Geom.

Key

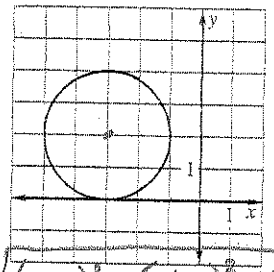
Write the standard equation of the circle.

1. 

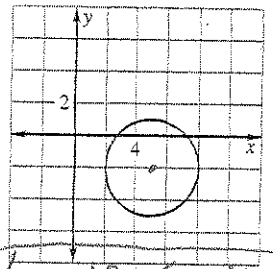
$x^2+y^2=36$

1. 

$(x-2)^2+(y-2)^2=16$

2. 

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

3. 

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

Write the standard equation of the circle with the given center and radius.

4. Center (4.1, 2.5), radius 3 $(x-4.1)^2+(y-2.5)^2=9$

5. Center (3.7, −6.2), radius 5 $(x-3.7)^2+(y+6.2)^2=25$

6. Center $\left(\frac{3}{2}, \frac{5}{2}\right)$, radius $\frac{1}{2}$ $\left(x-\frac{3}{2}\right)^2+\left(y-\frac{5}{2}\right)^2=\frac{1}{4}$

7. Center $\left(\frac{4}{3}, \frac{7}{2}\right)$, radius 2 $\left(x-\frac{4}{3}\right)^2+\left(y-\frac{7}{2}\right)^2=4$

Use the given information to write the standard equation of the circle.

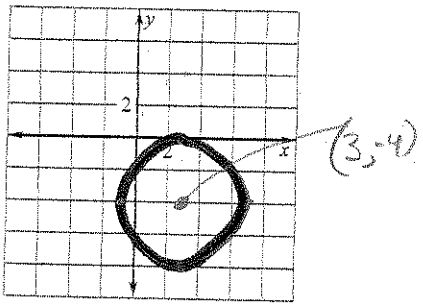
8. The center is (1, 3), and a point on the circle is (−4, 15). $r=13$ $(x-1)^2+(y-3)^2=169$

9. The center is (−5, −2), and a point on the circle is (7, 14) $(x+5)^2+(y+2)^2=400$

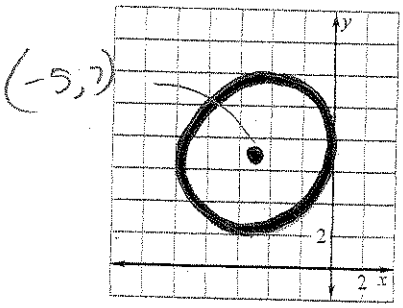
10. The center is (−1, 2), and a point on the circle is (47, 16) $(x+1)^2+(y-2)^2=2500$

Graph the equation.

11. $(x-3)^2+(y+4)^2=16$

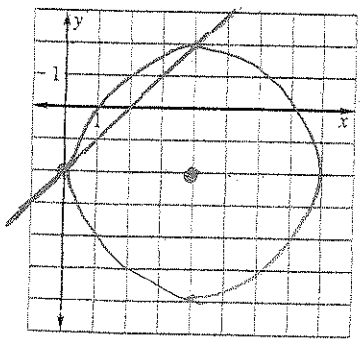


12. $(x+5)^2+(y-7)^2=25$

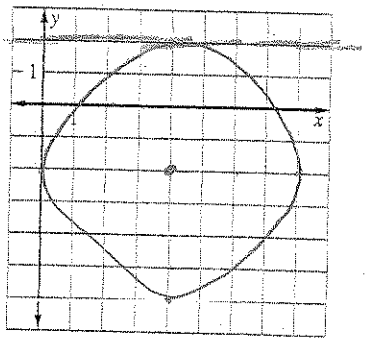


Graph the circle $(x-4)^2+(y+2)^2=16$ and the line with the given equation. Determine whether the line is a tangent or secant. *Explain.*

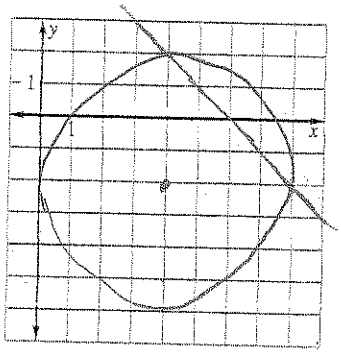
13. $y=x-2$ Secant

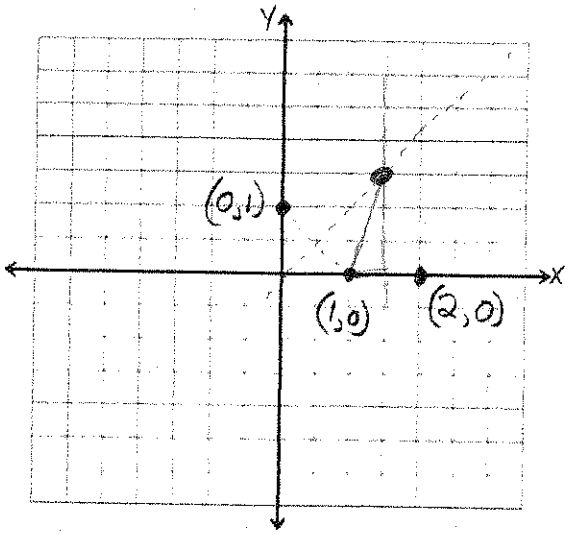


14. $y=2$ tangent



15. $y=-x+6$ Secant





There exists a circle that contains the points graphed. Find the center of the circle and write its equation. Graph the circle.

Perpendicular bisectors

Center (1.5, 1.5)

radius =

$\left(\frac{1}{2}\right)^2 + (1.5)^2 = r^2$

$2.5 = r^2$

$(x-1.5)^2 + (y-1.5)^2 = 2.5$

In Exercises 6 and 7, the *x*- and *y*-axis are tangent to a circle. Write an equation with the given characteristic. Is there more than one answer?

6. radius of 3 units

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

Yes

centers could be at these pts.

(-3, 3) (3, 3) (-3, -3) (3, -3)

27. Earthquakes After an earthquake, you are given seismograph readings from three locations, where the coordinate units are miles.

At $A(2, 1)$, the epicenter is 5 miles away.

At $B(-2, -2)$, the epicenter is 6 miles away.

At $C(-6, 4)$, the epicenter is 4 miles away.

a. Graph three circles in one coordinate plane to represent the possible epicenter locations determined by each of the seismograph readings.

b. What are the coordinates of the epicenter? (-2, 4)

c. People could feel the earthquake up to 9 miles from its epicenter. Could a person at (4, −5) feel it? *Explain.*

No to Far away