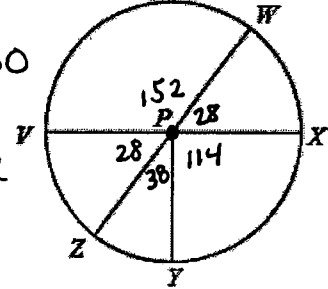


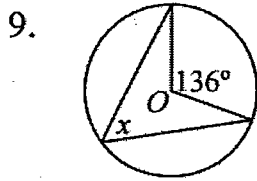
Show all work, neatly.

Find each measure in $\odot P$ if $m\angle WPX = 28^\circ$, $m\angle ZPY = 38^\circ$, and \overline{WZ} and \overline{XV} are diameters.

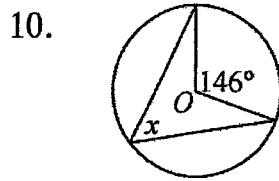
1. \widehat{YZ} 38 2. \widehat{WX} 28 3. $\angle VPZ$ 28 4. \widehat{VWX} 180
 5. $\angle XPY$ 114 6. \widehat{XY} 114 7. \widehat{XWY} 246 8. \widehat{WZX} 332



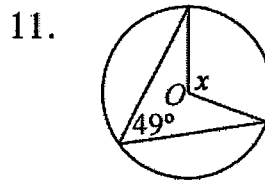
Calculate the value of x and justify your answer.



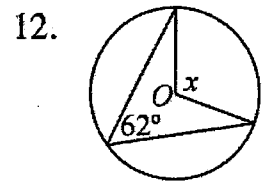
$x = 68$



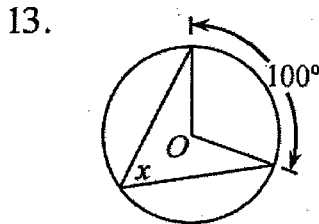
$x = 73$



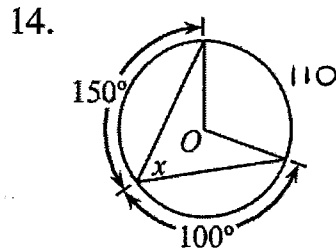
$x = 98$



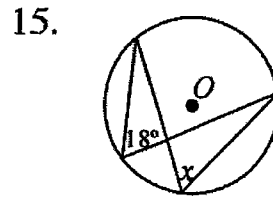
$x = 124$



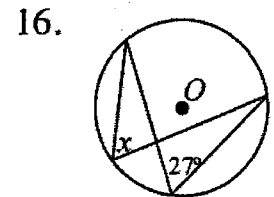
$x = 50$



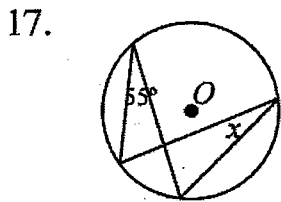
$x = 55$



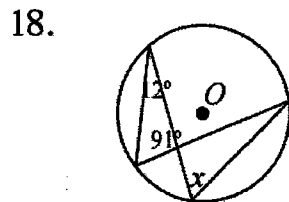
$x = 18$



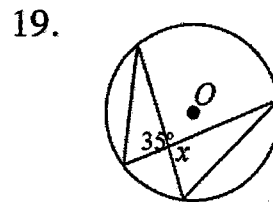
$x = 27$



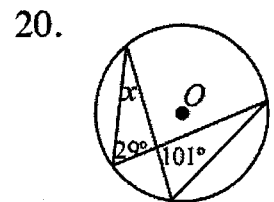
$x = 55$



$x = 77$



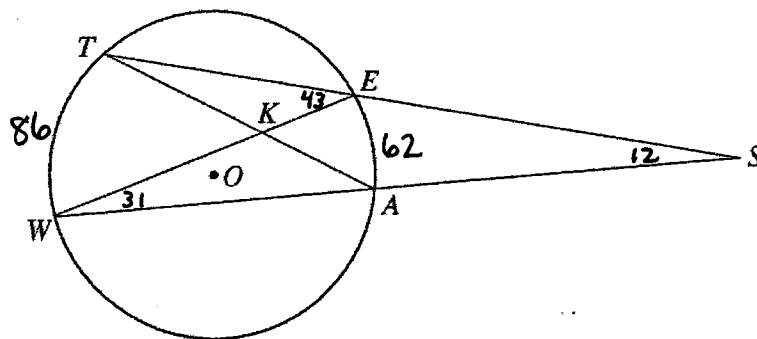
$x = 35$



$x = 50$

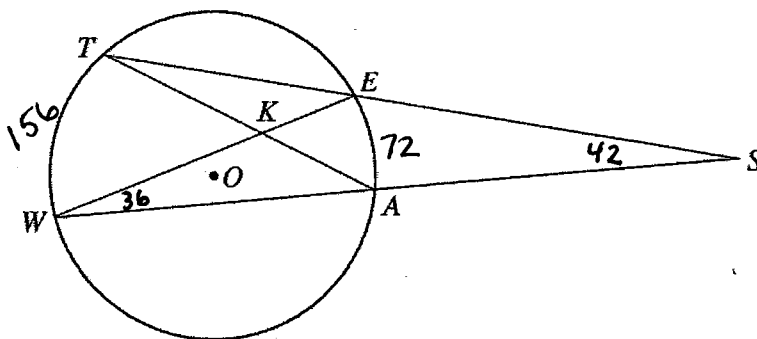
In $\odot O$, $m\widehat{WT} = 86^\circ$ and $m\widehat{EA} = 62^\circ$.

21. Find $m\angle EWA$. 31
22. Find $m\angle WET$. 43
23. Find $m\angle WES$. 137
24. Find $m\angle WST$. 12



In $\odot O$, $m\angle EWA = 36^\circ$ and $m\angle WST = 42^\circ$.

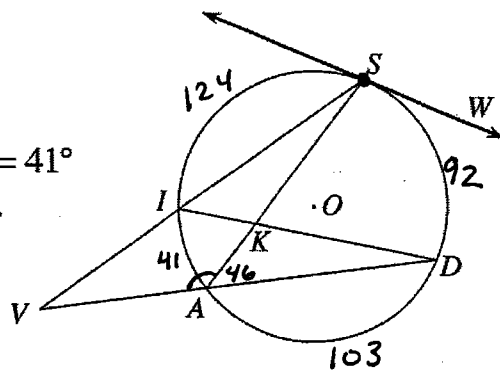
25. Find $m\angle WES$. 102
26. Find $m\widehat{TW}$. 156
27. Find $m\widehat{EA}$. 72
28. Find $m\angle TKE$. 66



29. In the figure at right, $m\widehat{SD} = 92^\circ$, $m\widehat{DA} = 103^\circ$, $m\widehat{AI} = 41^\circ$ and SW is tangent to $\odot O$. Find $m\angle AKD$ and $m\angle VAS$.

$$m\angle AKD = 113.5$$

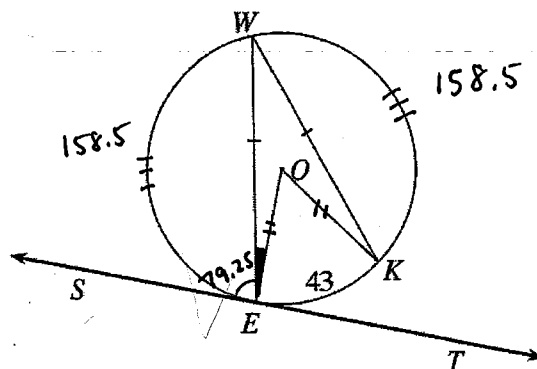
$$m\angle VAS = 134$$



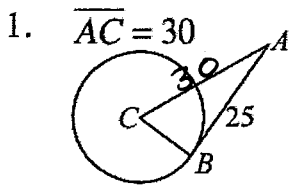
30. In the figure at right, $m\widehat{EK} = 43^\circ$, $\overline{EW} \cong \overline{KW}$, and \overline{ST} is tangent to $\odot O$. Find $m\angle WEO$ and $m\angle SEW$.

$$m\angle WEO = 10.75$$

$$m\angle SEW = 79.25$$

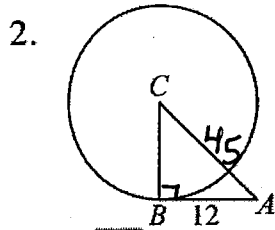


In each circle, C is the center and \overline{AB} is tangent to the circle point B . Find the area of each circle.



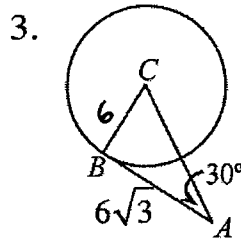
$$BC = \sqrt{275}$$

$$A = 275\pi$$



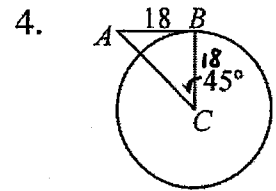
$$BC = \sqrt{1881}$$

$$A = 1881\pi$$



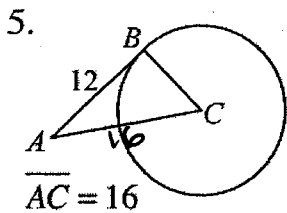
$$BC = 6$$

$$A = 36\pi$$



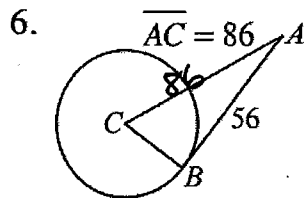
$$BC = 18$$

$$A = 324\pi$$



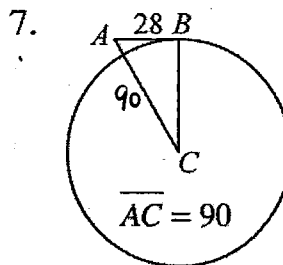
$$BC = \sqrt{112}$$

$$A = 112\pi$$



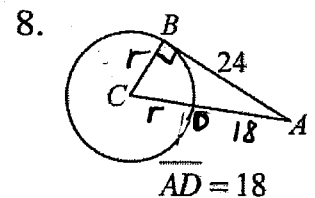
$$BC = \sqrt{4260}$$

$$A = 4260\pi$$



$$BC = \sqrt{7316}$$

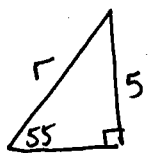
$$A = 7316\pi$$



$$BC = 7$$

$$A = 49\pi$$

9. In the figure at right, point E is the center and $m\angle CED = 55^\circ$. What is the area of the circle?



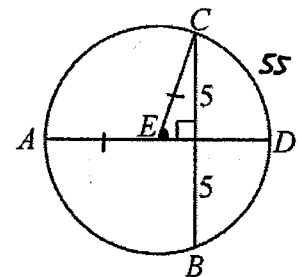
$$\frac{\sin(55)}{1} = \frac{5}{r}$$

$$r = \frac{5}{\sin(55)}$$

$$A = \pi \left(\frac{5}{\sin(55)} \right)^2$$

$$A = \frac{25\pi}{(\sin(55))^2}$$

$$A \approx 37.26\pi \text{ or } 117.05$$



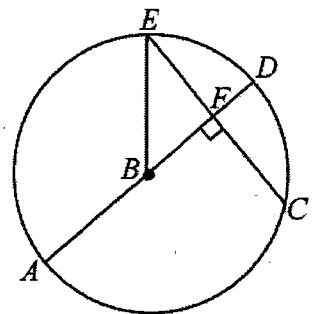
In the following problems, B is the center of the circle. Find the length of \overline{BF} given the lengths below.

10. $EC = 14, AB = 16$

$$BF = 3\sqrt{23}$$

11. $EC = 35, AB = 21$

$$BF = \sqrt{134.75}$$



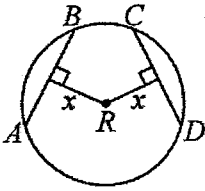
12. $FD = 5, EF = 10$

$$BF = 7.5$$

13. $EF = 9, FD = 6$

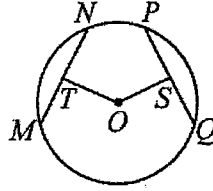
$$BF = 3.75$$

14. In $\odot R$, if $AB = 2x - 7$ and $CD = 5x - 22$, find x .



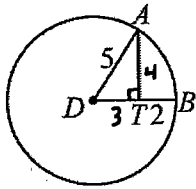
$x = 5$

15. In $\odot O$, $\overline{MN} \cong \overline{PQ}$, $MN = 7x + 13$, and $PQ = 10x - 8$. Find PS .



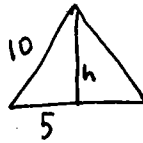
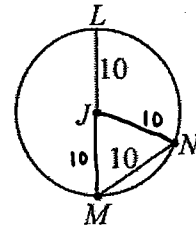
$PS = 31$

16. In $\odot D$, if $AD = 5$ and $TB = 2$, find AT .



$AT = 4$

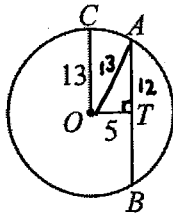
17. In $\odot J$, radius JL and chord MN have lengths of 10 cm. Find the distance from J to \overline{MN} .



$h = 5\sqrt{3}$

18. In $\odot O$, $OC = 13$ and $OT = 5$.

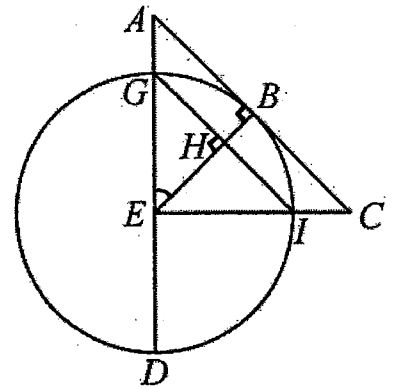
Find AB .



$AB = 24$

19. If \overline{AC} is tangent to circle E and $\overline{EH} \perp \overline{GI}$, is $\triangle GEH \sim \triangle AEB$? Prove your answer.

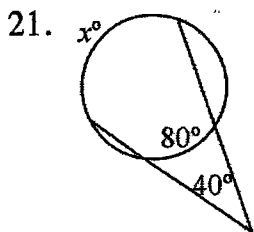
Yes. $AA \sim$



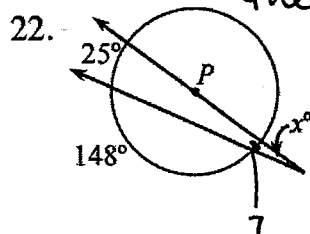
20. If \overline{EH} bisects \overline{GI} and \overline{AC} is tangent to circle E at point B , are \overline{AC} and \overline{GI} parallel? Prove your answer.

Yes. if a radius bisects a chord, they are \perp . if a radius intersects a tangent at the point of tangency, they are \perp . 2 lines \perp to the same line are \parallel to each other

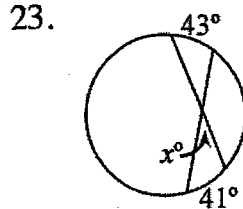
Compute the value of x :



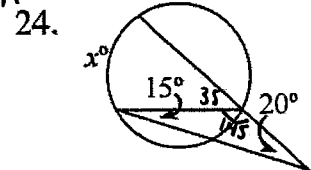
$x = 160$



$x = 9$



$x = 42$



$x = 70$

In $\odot F$, $m\widehat{AB} = 84^\circ$, $m\widehat{BC} = 38^\circ$, $m\widehat{CD} = 64^\circ$, $m\widehat{DE} = 60^\circ$. Find the measure of each angle and arc.

25. $m\widehat{EA} = 114$

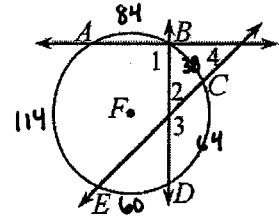
26. $m\widehat{AEB} = 276$

27. $m\angle 1 = 87$

28. $m\angle 2 = 49$

29. $m\angle 3 = 131$

30. $m\angle 4 = 38$

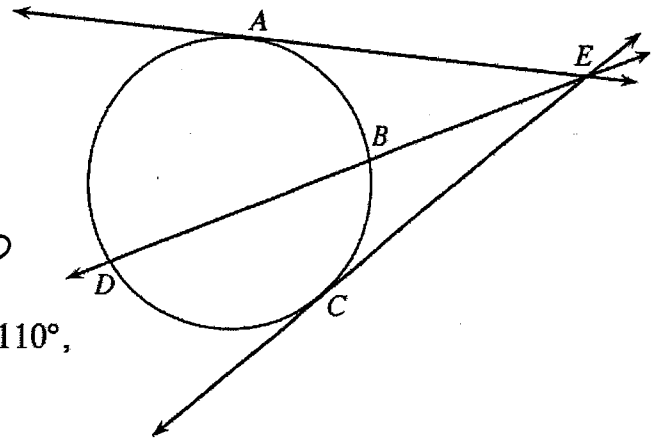


31. If $m\widehat{ADC} = 212^\circ$, what is $m\angle AEC$? 32

32. If $m\widehat{AB} = 47^\circ$ and $m\angle AED = 47^\circ$, what is $m\widehat{AD}$? 141

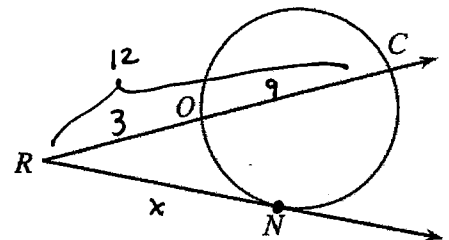
33. If $m\widehat{ADC} = 3 \cdot m\widehat{AC}$ what is $m\angle AEC$? 90

34. If $m\widehat{AB} = 60^\circ$, $m\widehat{AD} = 130^\circ$, and $m\widehat{DC} = 110^\circ$, what is $m\angle DEC$? 25



35. If \overline{RN} is a tangent, $RO = 3$, and $RC = 12$, what is the length of \overline{RN} ?

6



1. What is the equation of the circle centered at $(0, 0)$ with a radius of 25?

$$x^2 + y^2 = 625$$

2. What is the equation of the circle centered at the origin with a radius of 7.5?

$$x^2 + y^2 = 56.25$$

3. What is the equation of the circle centered at $(5, -3)$ with a radius of 9?

$$(x-5)^2 + (y+3)^2 = 81$$

Find the center and the radius of the circle for each equation below.

4. $(x+1)^2 + (y+5)^2 = 16$
 $C(-1, -5) \quad r=4$

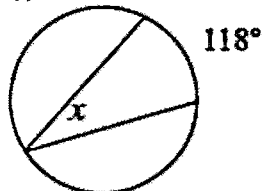
6. $(x-3)^2 + y^2 = 64$
 $C(3, 0) \quad r=8$

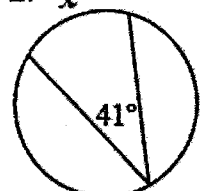
5. $x^2 + (y-6)^2 = 36$
 $C(0, 6) \quad r=6$

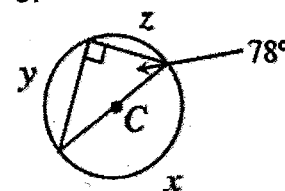
PRACTICE - CIRCLES

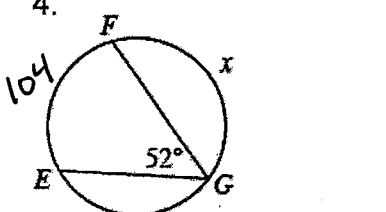
Name Key

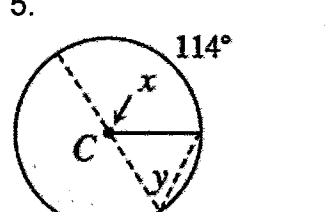
For questions 1 through 6, examine the diagrams below. Find the measures of the indicated angles or arcs. If a point is labeled C, assume it is the center of the circle. Show all work, neatly.

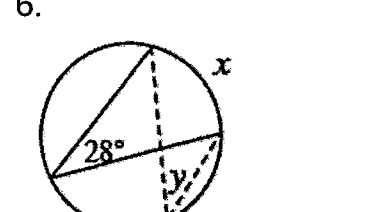
1.  118°
 $x = 59$

2.  41°
 $x = 82$

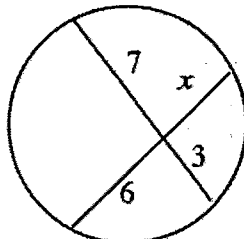
3.  78°
 $x = 180$ $y = 156$ $z = 24$

4.  104 52° x
 131° $x = 125$

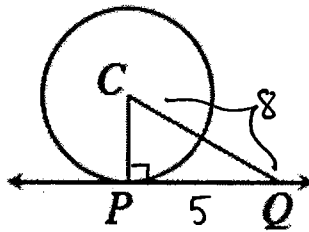
5.  114° x y
 $x = 114$ $y = 57$

6.  28° x y
 $x = 56$ $y = 28$

7. Find x.

 7 x 3 6
 $6x = 7(3)$
 $6x = 21$
 $x = \frac{7}{2}$
 or 3.5

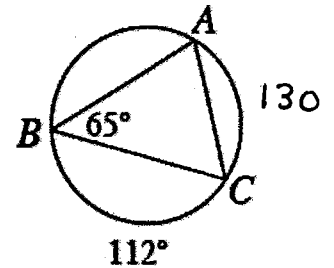
8. \overline{PQ} is tangent to $\odot C$ at P. If $PQ = 5$ and $CQ = 8$, find CP.



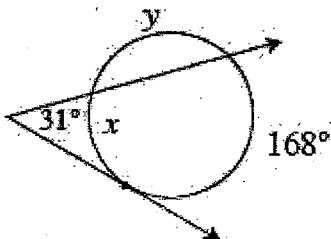
$5^2 + x^2 = 8^2$
 $x = \sqrt{39}$

9. $\triangle ABC$ is inscribed in the circle below. Using the measurements provided in the diagram, find $m\widehat{AB}$.

$m\widehat{AB} = 118$

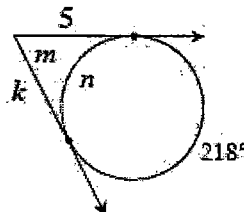


10. Find x and y.



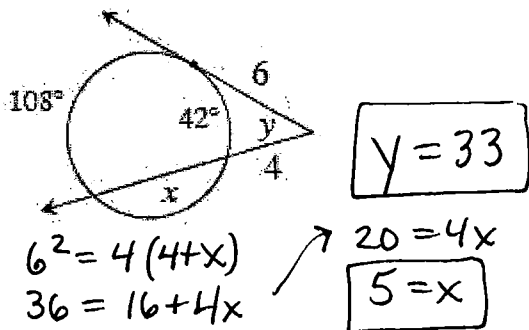
$x = 106$
 $y = 86$

11. Find m and n.

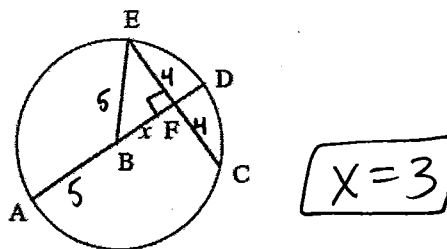


$m = 38$
 $n = 142$
 $k = 5$

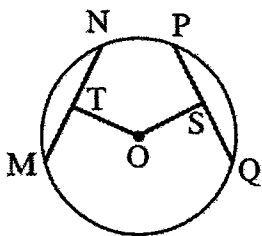
12. Find x and y.



13. In $\odot B$, find x if $EC = 8$ and $AB = 5$.



14. In $\odot O$, $\overline{MN} \cong \overline{PQ}$, $MN = 7x + 13$, and $PQ = 10x - 8$. Solve for x.



$$7x + 13 = 10x - 8$$

$$21 = 3x$$

$$7 = x$$

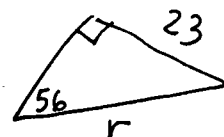
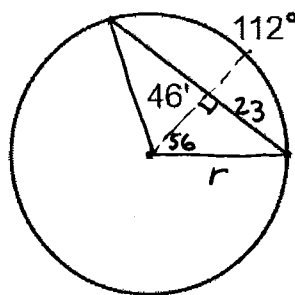
$$PQ = 10(7) - 8$$

$$PQ = 62$$

$$PS = \frac{1}{2}(62)$$

$$PS = 31$$

15. A 46' chord intercepts a 112° arc. Find the radius, circumference, and area of the circle, and the length of the minor arc.



$$\sin(56) = \frac{23}{r}$$

$$r = \frac{23}{\sin(56)}$$

$$r \approx 27.74$$

$$C = \frac{23}{\sin(56)} \cdot 2 \cdot \pi$$

$$C = \frac{46}{\sin(56)} \cdot \pi \approx 55.49$$

$$A = \left(\frac{23}{\sin(56)}\right)^2 \cdot \pi = \frac{529}{(\sin(56))^2} \cdot \pi \approx 2418.00$$

16. Find the equation of a circle with center (5, -8) and radius = 7

$$(x-5)^2 + (y+8)^2 = 49$$

$$\text{Length} = \frac{112}{360} \cdot \frac{46\pi}{\sin(56)}$$

$$\frac{14}{45} \cdot \frac{46\pi}{\sin(56)} = \frac{644\pi}{45 \cdot \sin(56)}$$

17. If a circle has the equation $(x+3)^2 + (x-4)^2 = 81$, then find the radius and the center.

$$r = 9$$

$$C(-3, 4)$$

$$\approx 54.23$$

THE BIG CIRCLE PUZZLE

You are given the following information - use it wisely:

- O is the center of the circle.
- \overline{DF} and \overline{CA} are diameters of $\odot O$.
- $AB = 10$
- $HI = 6$
- $m\angle HIO = 90$
- $OF = 10$
- $\angle DOA \cong \angle BOF$

Find the measure of each segment, arc, and angle requested below. Mark and label your diagram with all information, including the information that you find. Check your work as you proceed. Do not make any assumptions.

ANSWERS

1. $CA = 20$
2. $OA = 10$
3. $m\angle DOA = 60^\circ$
4. $m\widehat{DB} = 120^\circ$
5. $GI = 6$
6. $OB = 10$
7. $m\widehat{AB} = 60^\circ$
8. $m\angle FOB = 60^\circ$
9. $m\widehat{ADB} = 300^\circ$
10. $GH = 12$

11. $OI = 8$

12. $m\widehat{CD} = 120^\circ$

13. $m\angle GIC = 90^\circ$

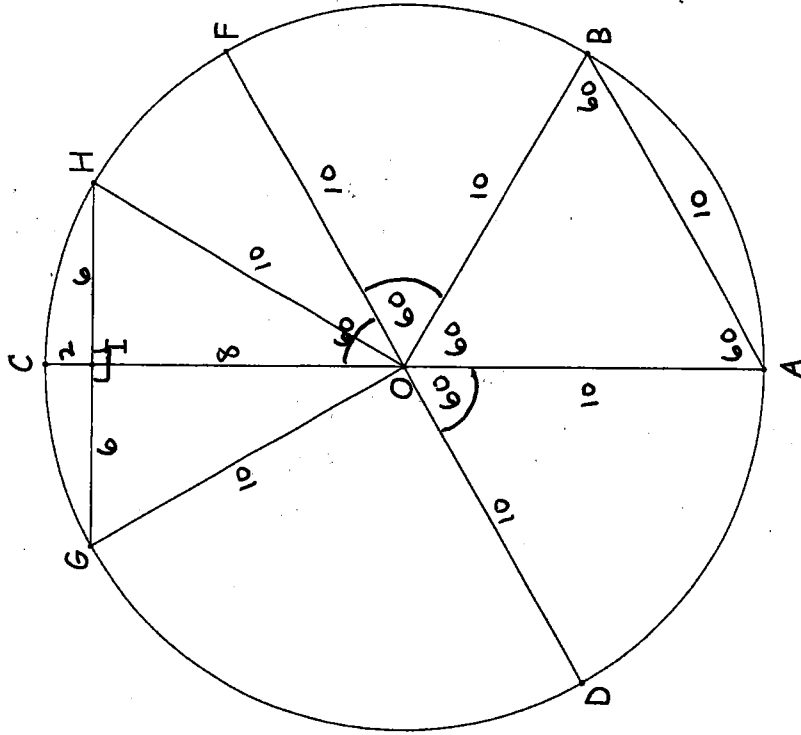
14. $m\angle COF = 60^\circ$

15. $IC = 2$

16. $m\widehat{CF} = 60^\circ$

17. $m\widehat{FDB} = 300^\circ$

18. $m\angle COD = 120^\circ$



THE BIGGER CIRCLE PUZZLE

You are given the following information:

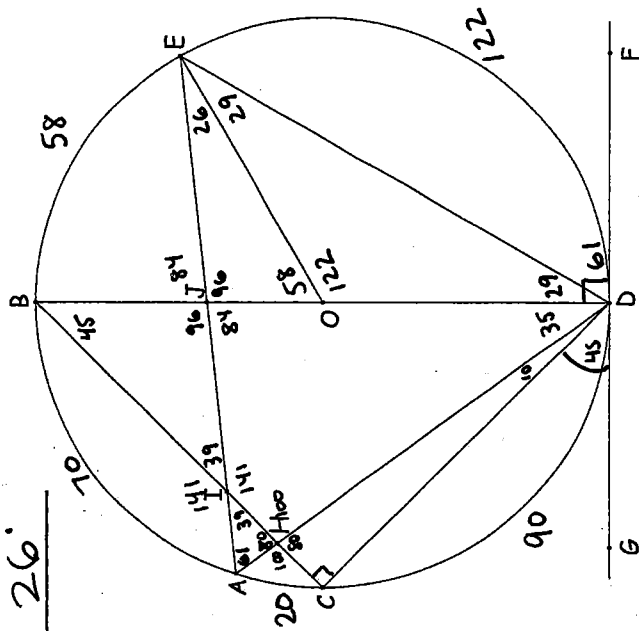
- O is the center of the circle.
- \overline{GF} is tangent to $\odot O$ at D .
- $m\widehat{DE} = 122$
- $m\widehat{AC} = 20$
- $m\widehat{DC} = 90$

Find the measure of each segment, arc, and angle requested below. Mark and label your diagram with all information, including the information that you find. Check your work as you proceed. Do not make any assumptions.

THE BIGGER CIRCLE PUZZLE - ANSWER PAGE

1. $m\angle EDF = \underline{61^\circ}$
2. $m\angle OED = \underline{29^\circ}$
3. $m\angle BDG = \underline{90^\circ}$
4. $m\angle ADC = \underline{10^\circ}$
5. $m\widehat{AB} = \underline{70^\circ}$
6. $m\angle DOE = \underline{122^\circ}$
7. $m\angle ODE = \underline{29^\circ}$
8. $m\angle BCD = \underline{90^\circ}$
9. $m\angle CDG = \underline{45^\circ}$
10. $m\widehat{BE} = \underline{58^\circ}$

11. $m\angle ADB = \underline{35^\circ}$
12. $m\angle AED = \underline{55^\circ}$
13. $m\angle BDF = \underline{90^\circ}$
14. $m\angle AIB = \underline{141^\circ}$
15. $m\angle DHB = \underline{100^\circ}$
16. $m\angle BIJ = \underline{39^\circ}$
17. $m\angle EJD = \underline{96^\circ}$
18. $m\angle JEO = \underline{26^\circ}$
19. $m\angle DAE = \underline{61^\circ}$
20. $m\angle BOE = \underline{58^\circ}$
21. $m\angle CDB = \underline{45^\circ}$
22. $m\angle CHD = \underline{80^\circ}$
23. $m\angle AIC = \underline{39^\circ}$
24. $m\angle AJB = \underline{96^\circ}$
25. $m\angle AJD = \underline{84^\circ}$



11. $m\angle ELD = 80^\circ$ 14. $CD = \frac{2194}{170}$
 12. $m\angle COF = 100^\circ$ 15. $FM = \frac{255}{255}$
 13. $m\angle FNB = 65^\circ$

THE BIGGEST CIRCLE PUZZLE

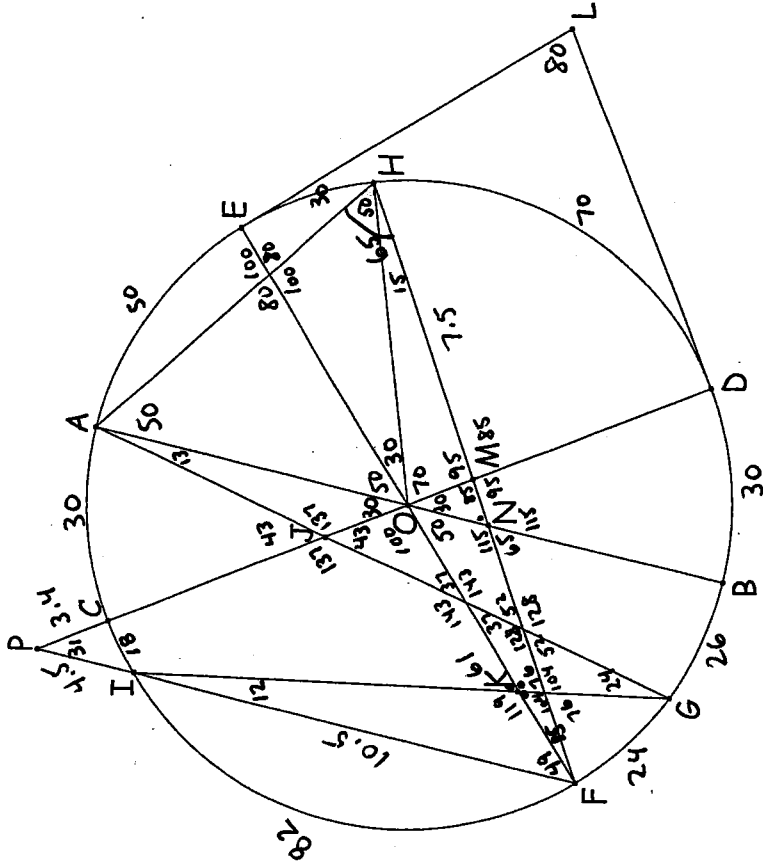
You are given the following information:

- O is the center of the circle.
- \overline{AB} , \overline{CD} , and \overline{EF} are diameters of $\odot O$.
- $m\widehat{GB} = 26$
- $m\angle AOC = 30$, $m\angle OAH = 50$, $m\angle AHF = 65$, and $m\angle IGA = 24$
- $IF = 10.5$, $PI = 4.5$, $PC = 3.4$, $CM = 10$, and $HM = 7.5$

Find the measure of each segment, arc, and angle requested below. Mark and label your diagram with all information, including the information that you find. Check your work as you proceed. Do not make any assumptions.

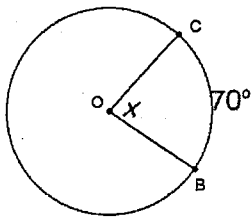
THE BIGGEST CIRCLE PUZZLE - ANSWER PAGE

- $m\widehat{CB} = 150$
- $m\widehat{CG} = 124$
- $m\widehat{FG} = 24$
- $m\angle FIG = 12$
- $m\angle IKF = 119$
- $m\angle AJC = 43$
- $m\angle FOB = 50$
- $m\angle FPC = 31$
- $m\widehat{FI} = 82$
- $m\widehat{AE} = 50$



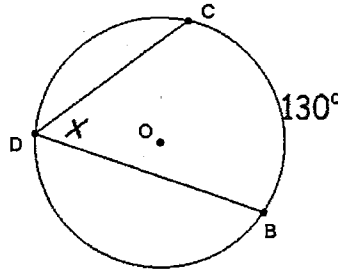
For each angle, arc, or segment relationship, complete the example by solving for the variable(s). Show all work.

Central angle



$$x = 70$$

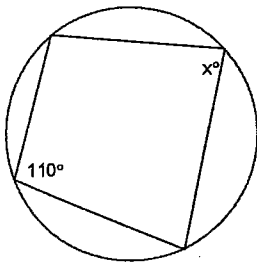
Inscribed angle



$$x = \frac{1}{2}(130)$$

$$x = 65$$

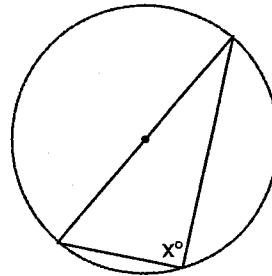
Angles of inscribed quadrilateral



$$x + 110 = 180$$

$$x = 70$$

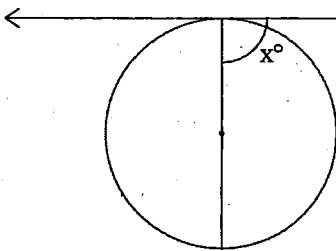
Inscribed angle of a semicircle



$$x = \frac{1}{2}(180)$$

$$x = 90$$

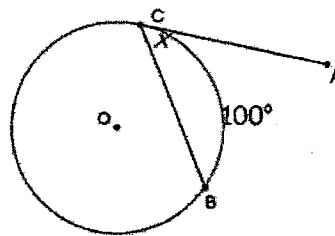
Diameter drawn to tangent at point of tangency



$$x = \frac{1}{2}(180)$$

$$x = 90$$

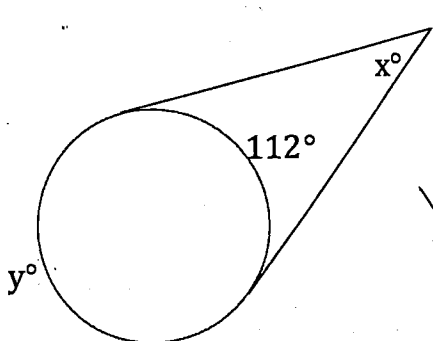
Angle formed by secant/chord drawn to tangent at point of tangency



$$x = \frac{1}{2}(100)$$

$$x = 50$$

Angle formed by two tangents (outside circle)



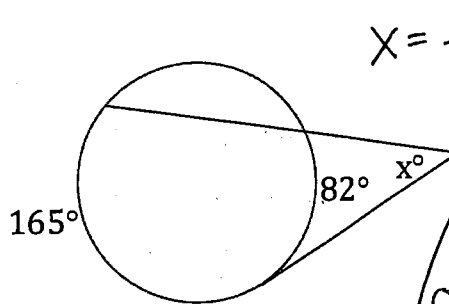
$$x + 112 = 180$$

$$x = 68$$

$$y + 112 = 360$$

$$y = 248$$

Angle formed by secant and tangent (outside circle)



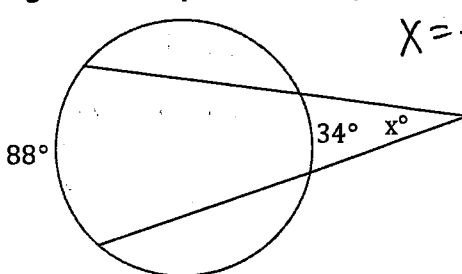
$$x = \frac{1}{2}(165 - 82)$$

$$x = \frac{1}{2}(83)$$

$$x = \frac{83}{2}$$

$$\text{or } x = 41.5$$

Angle formed by two secants (outside circle)

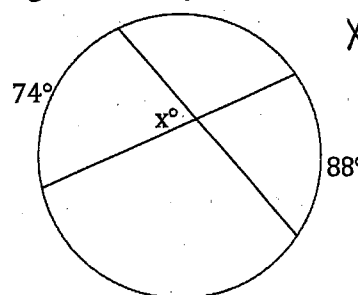


$$x = \frac{1}{2}(88 - 34)$$

$$x = \frac{1}{2}(54)$$

$$x = 27$$

Angle formed by intersecting chords (inside circle)

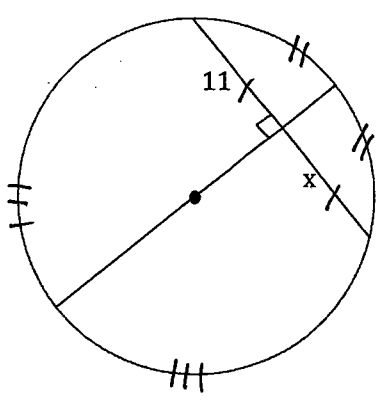
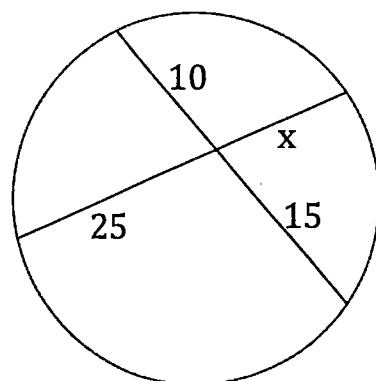
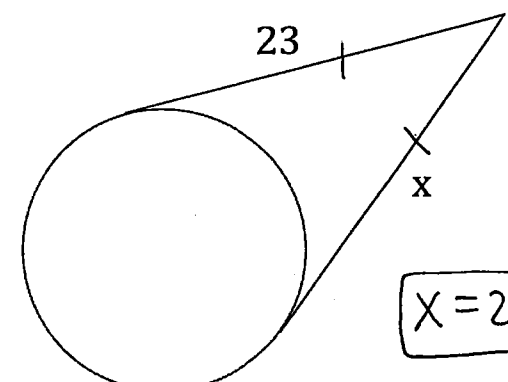
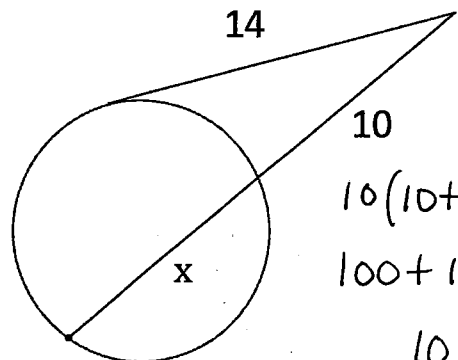
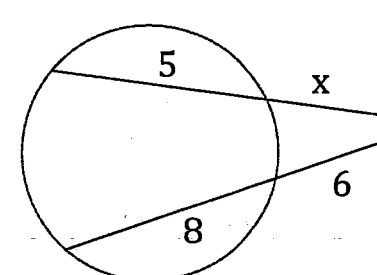
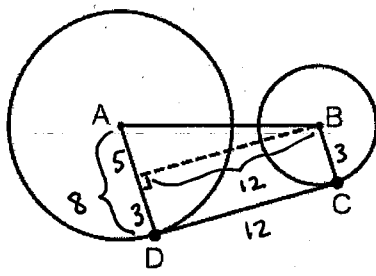


$$x = \frac{1}{2}(74 + 88)$$

$$x = \frac{1}{2}(162)$$

$$x = 81$$

For each angle, arc, or segment relationship, complete the example by solving for the variable(s). Show all work.

<p>Diameter Perpendicular to a Chord</p>  <p>$X = 11$</p>	<p>Length of Segments of Intersecting Chords</p>  <p> $25x = 10(15)$ $25x = 150$ $X = 6$ </p>
<p>Length of Intersecting Tangent Segments</p>  <p>$X = 23$</p>	<p>Length of Segments of Intersecting Tangent & Secant</p>  <p> $10(10+x) = 14^2$ $100 + 10x = 196$ $10x = 96$ $X = 9.6$ or $X = \frac{48}{5}$ </p>
<p>Length of Segments of Intersecting Secant & Secant</p>  <p> $X(X+5) = 6(6+8)$ $X^2 + 5X = 84$ $X^2 + 5X - 84 = 0$ $(X+12)(X-7) = 84$ $X+12=0$ $X-7=0$ $X=-12$ $X=7$ </p> <p> $X = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $X = \frac{-5 \pm \sqrt{(5)^2 - 4(1)(-84)}}{2(1)}$ $X = \frac{-5 \pm \sqrt{361}}{2}$ $X = \frac{-5 + 19}{2} = \frac{14}{2} = 7$ $X = \frac{-5 - 19}{2} = \frac{-24}{2} = -12$ </p>	<p>Distance Between Centers of Circles With a Line Tangent to Both Circles.</p> <p>The radius of circle A = 8, the radius of circle B = 3, \overline{CD} is tangent to both circles, at D and C, and $CD = 12$. Find AB.</p>  <p> $5^2 + 12^2 = x^2$ $169 = x^2$ $\sqrt{169} = x$ $13 = x$ </p>