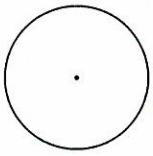
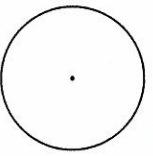
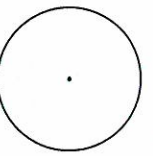
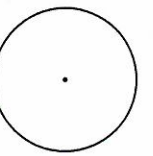
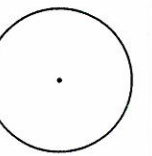


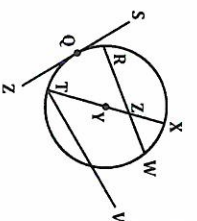
Section #1 - Segments in Circles
 I can...

- A Identify, sketch, and/or define segments related to a circle
- B Determine whether or not a line is tangent to a circle
- C Find lengths of segments in circles

Name	Definition	Example
Radius	The _____ from the _____ to any point _____ the circle.	
Chord	A _____ whose _____ are _____ the circle.	
Diameter	A _____ that passes through the _____ of the circle. (Note: A diameter is the _____ chord.)	
Tangent	A line that _____ the circle at exactly _____ point.	
Secant	A line that _____ the circle at exactly _____ points.	

1) Name an example of each of the following in the diagram of $\odot Y$ below:

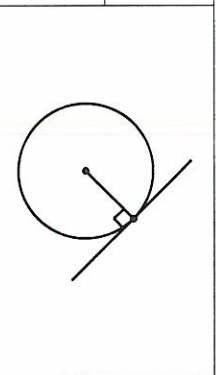
- a. Radius _____
- b. Chord _____
- c. Tangent _____
- d. Diameter _____
- e. Secant _____



* The point at which a _____ line _____ the circle to which it is tangent to is called the **point of tangency**.

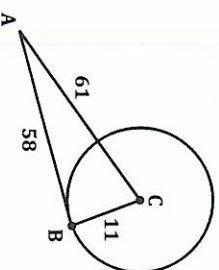
Tangent-Radius Theorem
 If a line is tangent to a circle, then it is _____ to the _____ drawn to the _____ of _____.

Converse of Tangent-Radius Theorem
 In a plane, if a line is perpendicular to a radius of a circle at its endpoint on the circle, then the line is tangent to the circle.

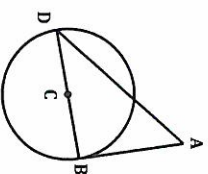


* We can use these theorems along with the _____ of the _____ Theorem to decide whether or not a line is _____ to a circle.

2) Decide whether or not \overline{AB} is tangent to $\odot C$.

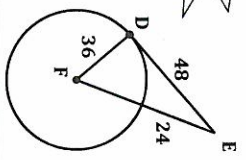


3) If $CB = 9$, $AD = 82$, and $AB = 80$, decide whether or not \overline{AB} is tangent to $\odot C$.



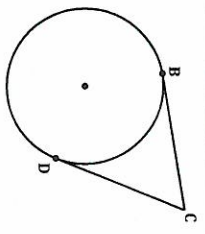
You Try!
#4

Decide whether or not \overline{DE} is tangent to $\odot F$.



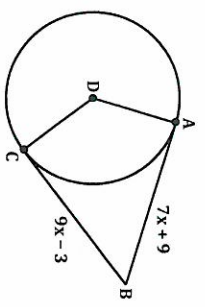
Two-Tangent Theorem

If two _____ segments are drawn to a circle from an _____ point, then those segments are _____.

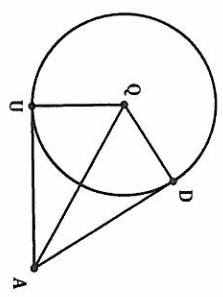


B and D are points of tangency.

5) \overline{AB} and \overline{BC} are tangent to $\odot D$ at points A and C. Find BC.

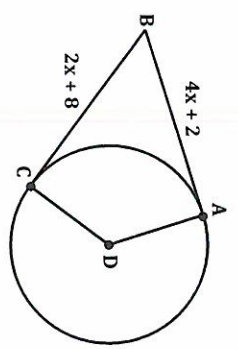


6) In $\odot Q$ below, D and U are points of tangency. If the diameter of the circle is 16 and $QA = 17$, find the perimeter of kite QUAD.



You Try!
#7

\overline{AB} and \overline{BC} are tangent to $\odot D$ at points A and C. Find the value of x.



Section #2 - Arcs and Chords of Circles

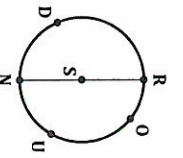
I can...
C Find lengths of segments in circles
D Identify and name arcs of a circle

- * An arc is a _____ of a _____.
- * There are 3 types of arcs:

Name	Measure	Example(s)	Label
Minor Arc			
Major Arc			
Semicircle			

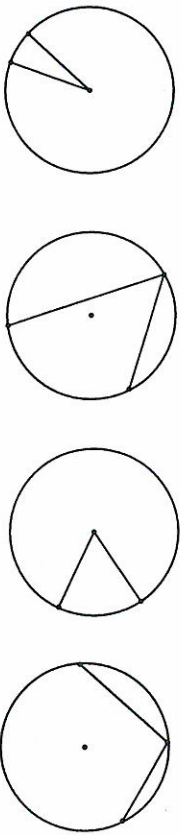
For #8-10, use the diagram of $\odot S$ to the right.

- 8) Name 3 minor arcs: _____
 9) Name 3 major arcs: _____
 10) Name two semicircles: _____



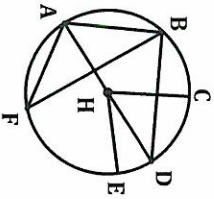
An intercepted arc is the part of a circle "cut off" by an _____.

Examples of intercepted arcs:



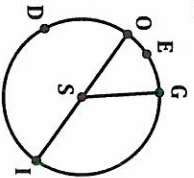
11) In $\odot H$, name the intercepted arc "cut off" by the given angle:

- a. $\angle BDA$ _____
 b. $\angle EHC$ _____
 c. $\angle FAD$ _____
 d. $\angle FAB$ _____
 e. $\angle ABD$ _____
 f. $\angle AFB$ _____



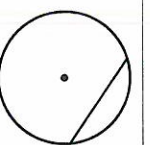
Name an example of each of the following arcs in $\odot S$ below.

- Minor arc: _____
 Major arc: _____
 Semicircle: _____
 Intercepted arc for $\angle GSI$: _____



Distance from Center to Chord

The distance from the center of a circle to a chord is the _____ of the _____ segment from the _____ to the _____.

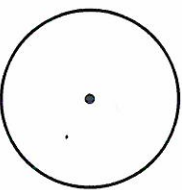


Radius-Chord Theorem

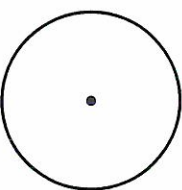
If a _____ is _____ then it _____ the _____ to the _____.



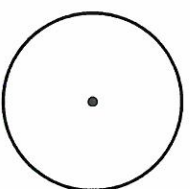
13) Suppose a chord of a circle is 16 inches long and is 6 inches from the center of the circle. Find the length of a radius.



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



A chord measures 24 cm and the radius of the circle is 15 cm. Find the distance the chord is from the center of the circle.

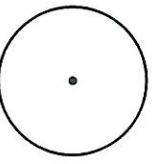


Section #3 - Angles Related to Circles

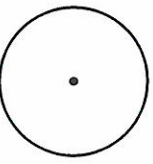
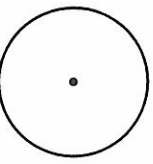
I can...

- E Identify, sketch, and/or define angles related to a circle
- F Find missing values of angles and arcs in circles

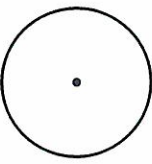
Angles with Vertices on the _____ of a Circle

Name	Definition	Example	Measure
Central Angle	An angle whose _____ is on the _____ of the _____ circle.		

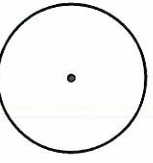


Angles with Vertices _____ a Circle

Name	Definition	Example	Measure
Inscribed Angle	An angle whose _____ is _____ the _____.		
Tangent-Chord Angle	An angle formed by a _____ segment and a _____ of a circle.		

Angles with Vertices _____ but _____ at the Center of a Circle

Name	Definition	Example	Measure
Chord-Chord Angle	An angle formed by _____ of the circle.		

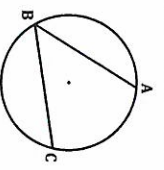
Angles with Vertices _____ a Circle

Name	Definition	Example	Measure
Secant-Secant Angle	An angle formed by two _____ segments of a circle.		
Secant-Tangent Angle	An angle formed by a _____ segment and a _____ segment of a circle.		
Tangent-Tangent Angle	An angle formed by two _____ segments drawn from an _____ point.		

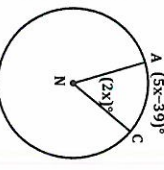
ARC-ANGLE SUMMARY:

- * The KEY is the _____ of the _____.
- * Vertex at center \Rightarrow
- * Vertex Inside the circle \Rightarrow
- * Vertex on circle \Rightarrow
- * Vertex outside the circle \Rightarrow

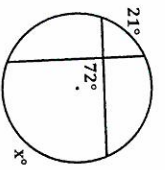
16) $m\angle C = 112$. Find $m\angle B$.



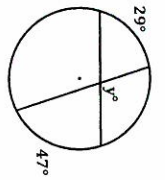
17) Find $m\angle N$.



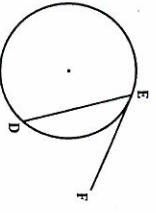
18) Find the value of x.



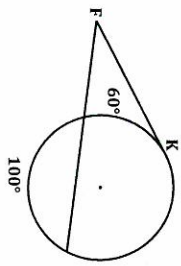
19) Find the value of y.



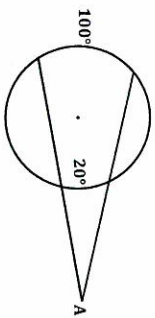
20) \overline{FE} is tangent at point E and $m\widehat{DE} = 80$. Find $m\angle DEF$.



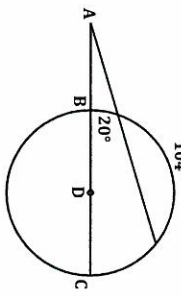
21) \overline{FK} is tangent at K. Find $m\angle F$.



22) Find $m\angle A$.

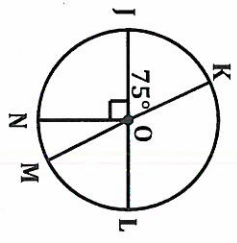


23) BC is a diameter of $\odot D$. Find $m\angle A$.

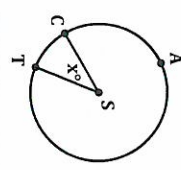
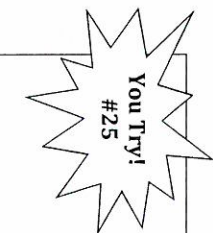


24) In $\odot O$, use central angles to find the measure of each intercepted arc.

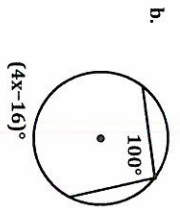
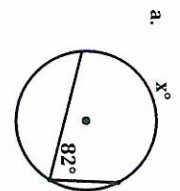
- a. \widehat{JK} _____
- b. \widehat{KL} _____
- c. \widehat{LM} _____
- d. \widehat{LN} _____
- e. \widehat{MN} _____
- f. \widehat{KL} _____
- g. \widehat{MK} _____
- h. \widehat{LM} _____
- i. \widehat{LN} _____



In $\odot S$, $m\widehat{CAT} = 320^\circ$. Find the value of x.

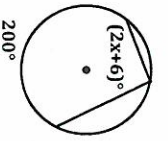


26) Find the value of x.

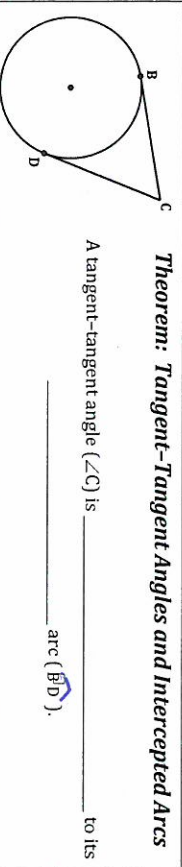


27) Find the measure of an inscribed angle if it intercepts an 84° arc.

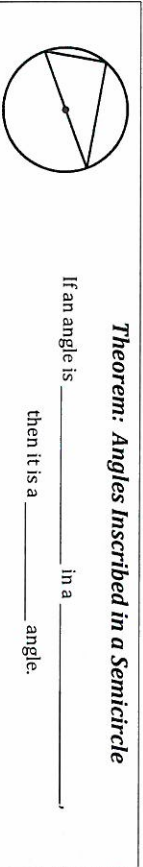
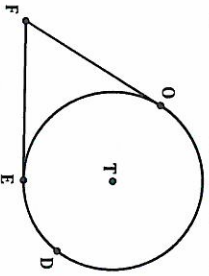
Find the value of x .



Theorem: Tangent-Tangent Angles and Intercepted Arcs

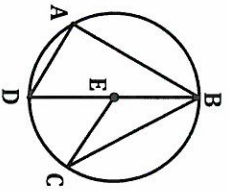


29) $\angle F$ is a tangent-tangent angle. If $\angle F = (6x)^\circ$ and $\widehat{DE} = (15x + 33)^\circ$, find $m\widehat{DE}$.



30) In $\odot E$, $\angle DEC = 50^\circ$, and $\angle ABD = 30^\circ$, find the measures of the intercepted arcs and angles.

- a. \widehat{CD} _____
- b. \widehat{BC} _____
- c. $\angle CBD$ _____
- d. $\angle ABC$ _____
- e. \widehat{BAD} _____
- f. \widehat{AB} _____



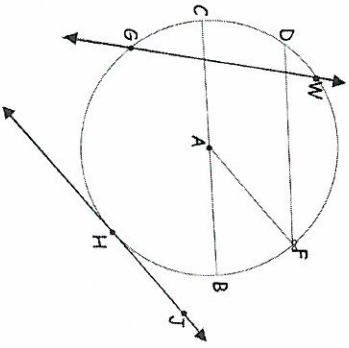
g. $\angle BAD$ _____

LEARNING TARGETS

Date	Goal	I can ...	#	Self-Evaluation
	A	Identify, sketch, and/or define segments related to a circle	1	Got it! <input type="checkbox"/> Sort of got it! <input type="checkbox"/> Didn't get it! <input type="checkbox"/>
	B	Determine whether or not a line is tangent to a circle	4	Got it! <input type="checkbox"/> Sort of got it! <input type="checkbox"/> Didn't get it! <input type="checkbox"/>
	C	Find lengths of segments in circles	7 15	Got it! <input type="checkbox"/> Sort of got it! <input type="checkbox"/> Didn't get it! <input type="checkbox"/>
	D	Identify and name arcs of a circle	12	Got it! <input type="checkbox"/> Sort of got it! <input type="checkbox"/> Didn't get it! <input type="checkbox"/>
	E	Identify, sketch, and/or define angles related to a circle	25 28	Got it! <input type="checkbox"/> Sort of got it! <input type="checkbox"/> Didn't get it! <input type="checkbox"/>
	F	Find missing values of angles and arcs in circles	25 28	Got it! <input type="checkbox"/> Sort of got it! <input type="checkbox"/> Didn't get it! <input type="checkbox"/>

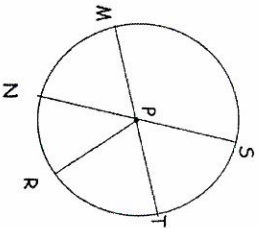
Definitions, Angle, Arc Worksheet

For CIRCLE A Identify the following:



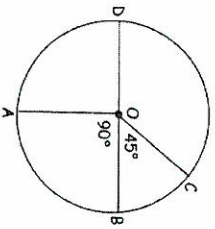
1. \overline{AB} _____
2. \overline{DF} _____
3. \overline{WG} _____
4. \overline{HJ} _____
5. point H _____
6. \overline{CB} _____
7. point A _____

8. Circle P with $m\angle NPR = 29^\circ$ and $m\angle SPT = 51^\circ$. Determine the degree of each arc and the type (major, minor, semi-circle).

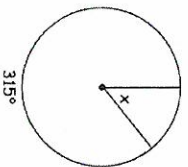


- a) $m\widehat{NR}$ = _____ type _____
- b) $m\widehat{ST}$ = _____ type _____
- c) $m\widehat{TSR}$ = _____ type _____
- d) $m\widehat{MST}$ = _____ type _____

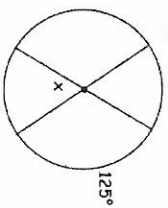
- 9-12 refer to $\odot O$. Find the measure of each arc.
9. $m\widehat{AB}$ _____
10. $m\widehat{CD}$ _____
11. $m\widehat{AC}$ _____
12. $m\widehat{ADC}$ _____



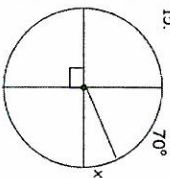
Find the value of x.



14.

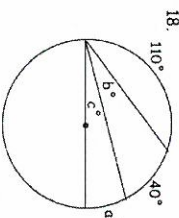


15.

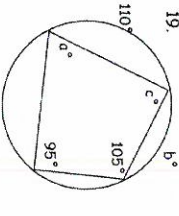


16. At ten o'clock the hands of a clock form an angle of _____ degrees.

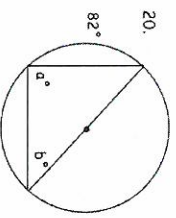
17. At seven o'clock the hands of a clock form an angle of _____ degrees.



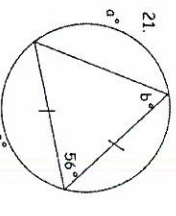
18. $d =$ _____
 $b =$ _____
 $c =$ _____



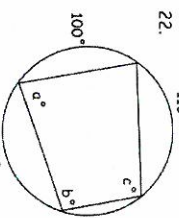
19. $d =$ _____
 $b =$ _____
 $c =$ _____



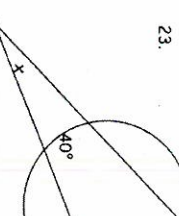
20. $d =$ _____
 $b =$ _____
 $c =$ _____



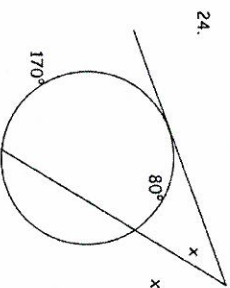
21. $d =$ _____
 $b =$ _____
 $c =$ _____



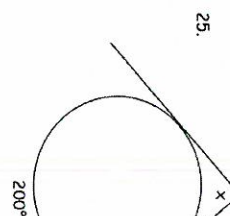
22. $d =$ _____
 $b =$ _____
 $c =$ _____



23. $x =$ _____



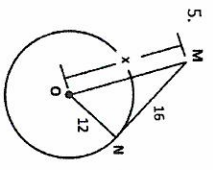
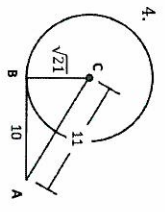
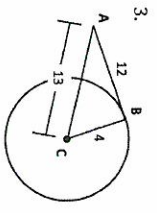
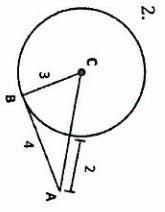
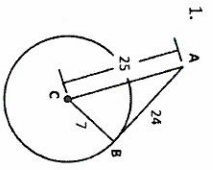
24. $x =$ _____



25. $x =$ _____

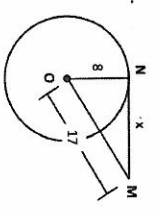
Geometry - Tangents Worksheet

Determine whether \overline{AB} is tangent to the circle. Justify your answer.

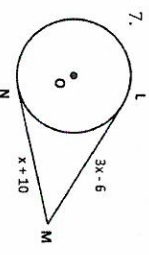


Given: \overline{MN} is tangent to Circle O at Point N

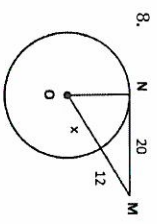
Solve for x .



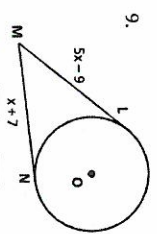
Given: \overline{MN} is tangent to Circle O at Point N



Given: \overline{MN} and \overline{LM} are tangent to Circle O



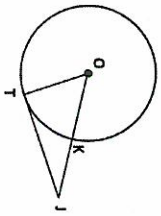
Given: \overline{MN} is tangent to Circle O at Point N



Given: \overline{MN} and \overline{LM} are tangent to Circle O

Answer the following questions using the diagram below.

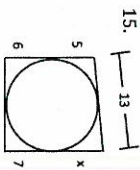
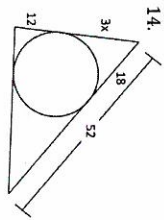
10. If $OT = 6$ and $JO = 10$, find JT .



Given: \overline{JT} is tangent to Circle O at Point T

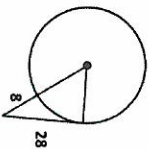
11. If $OT = 6$ and $JT = 10$, find JO .

Find the value of x . Then find the perimeter of the polygon.



14. A green on a golf course is in the shape of a circle. A golf ball is 8 feet from the edge of the green, and 28 feet from a point of tangency. (See below)

16. What is the radius of the green?



12. If $m\angle TOJ = 60^\circ$ and $OT = 6$, find JO .

17. How far is the golf ball from the center of the green?

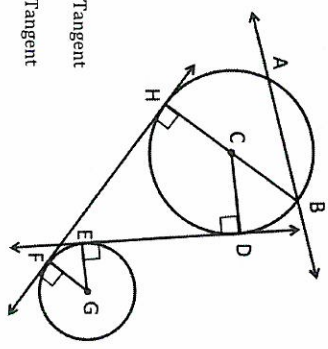
13. If $|JK| = 9$ and $KO = 8$, find JT .

* Congruent chords cut off congruent arcs
 * Radius that is \perp to chord, bisects the chord

Geometry - Arcs and Chords Worksheet

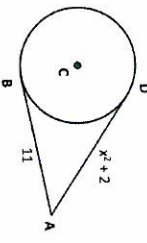
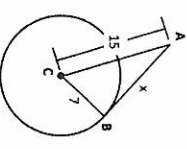
Match the notation with the term best describes it.

- | | |
|---------------------|----------------------------|
| 13. \overline{AB} | A. Center |
| 14. H | B. Chord |
| 15. \overline{HF} | C. Diameter |
| 16. \overline{CH} | D. Radius |
| 17. C | E. Point of Tangency |
| 18. \overline{HB} | F. Common External Tangent |
| 19. \overline{AB} | G. Common Internal Tangent |
| 20. \overline{DE} | H. Secant |

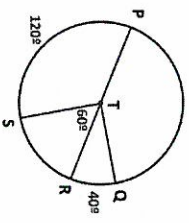


Solve the following problems.

21. Given: \overline{AB} is tangent to Circle C
22. Given: \overline{AD} and \overline{AB} are tangent to Circle C

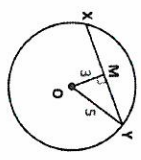


- Find each measure in Circle T.
- | | |
|---------------------|---------------------|
| 23. $m\widehat{RS}$ | 24. $m\widehat{PS}$ |
| 25. $m\widehat{QR}$ | 26. $m\widehat{QS}$ |
| 27. $m\widehat{SP}$ | 28. $m\angle QTR$ |

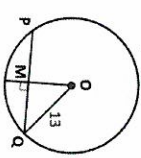


For each picture, O is the center of the circle. Find the indicated measure.

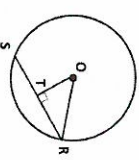
1. Find \widehat{XY} .



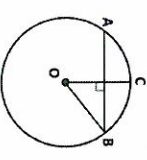
2. $PQ = 24$. Find OM .



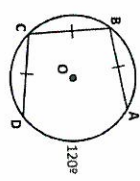
3. $OT = 9$ and $RS = 18$. Find OR .



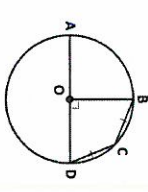
4. $m\widehat{AB} = 110$. Find $m\angle COB$.



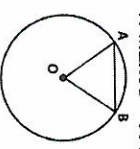
5. Find $m\widehat{BC}$



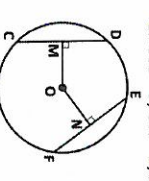
6. Find $m\widehat{CD}$



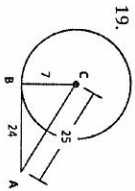
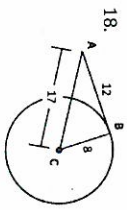
7. $m\angle AOB = 60$ and $AB = 24$. Find OA .



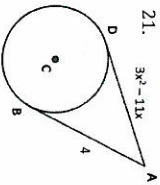
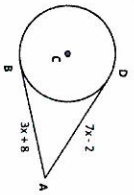
8. $OM = 7$, $ON = 7$, and $CM = 6$. Find EF .



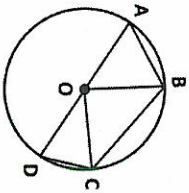
Tell whether \overline{AB} is tangent to Circle C. Show your work.



\overline{AB} and \overline{AD} are tangent to Circle C. Solve for x.



Use the figure below to answer the following questions.



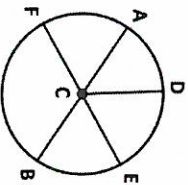
22. If $m\angle AOB = 60$, find $m\widehat{AB}$.

23. If $m\angle BOC = 90$, find $m\widehat{BC}$.

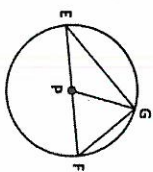
24. Name the inscribed polygon in the figure.

Determine whether the arcs is a minor arc, a major arc, or a semicircle of Circle C. (Assume the picture is drawn to scale)

- 25. \widehat{AE}
- 26. \widehat{ADB}
- 27. \widehat{FDE}
- 28. \widehat{DFB}
- 29. \widehat{BE}
- 30. \widehat{FA}
- 31. \widehat{BDA}
- 32. \widehat{FB}



Use the figure on the right to answer the following questions.



$m\angle FPG = 75^\circ$

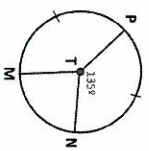
33. Find $m\widehat{FG}$.

34. Find $m\widehat{EGF}$.

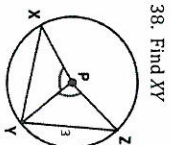
35. Find $m\widehat{DE}$.

36. Find $m\widehat{EFG}$.

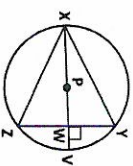
Answer the following questions.



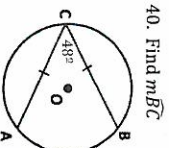
37. Find $m\widehat{MN}$.



38. Find \widehat{XY}

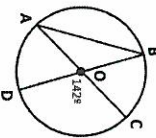


39. $ZY = 6, XW = 4$, find XY

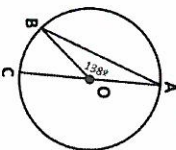


40. Find $m\widehat{BC}$

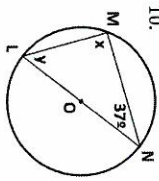
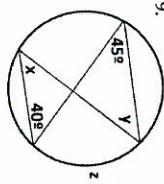
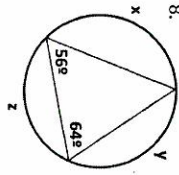
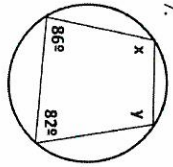
41. Find $m\angle BAC$



42. Find $m\angle BAC$

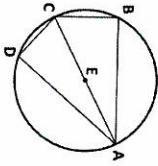


For each picture, find the value of each variable.

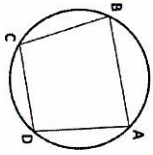


For each picture, find the indicated measure.

11. $m\widehat{BCD} = 136^\circ$.
Find $m\angle B$, $m\angle D$, and $m\angle DCB$.

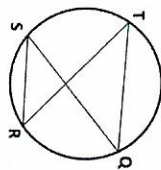


12. $m\angle D = 105^\circ$, $m\angle C = 100^\circ$.
Find $m\angle A$, $m\angle B$, and $m\widehat{BCD}$.

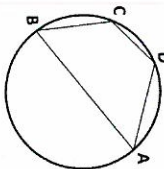


For each picture, find the indicated measure.

13. Find $m\angle SRT$ and $m\angle RSQ$.
 $m\angle RSQ = 5x + 4$
 $m\angle QTR = 6x - 2$
 $m\angle SQT = 32^\circ$

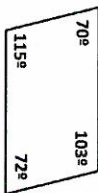


14. Find $m\angle A$, $m\angle B$, $m\angle C$, and $m\angle D$.
 $m\angle A = 9y$ $m\angle C = 14x$
 $m\angle B = 4x$ $m\angle D = 24y$



Use your knowledge of inscribed quadrilaterals to answer the following question.

15. Determine whether the following quadrilateral can be inscribed in a circle. Explain your reasoning.



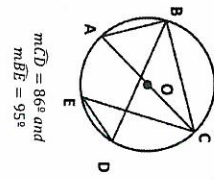
Find the following measurements using the figure below.

43. Find $m\angle ABC$ 44. Find $m\angle CED$

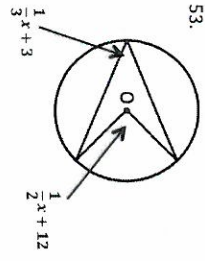
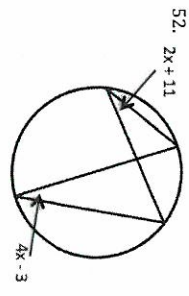
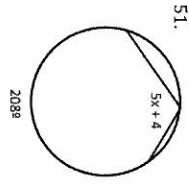
45. Find $m\angle BDE$ 46. Find $m\angle CBD$

47. Find $m\angle ABD$ 48. Find $m\angle BCE$

49. Find mAD 50. Find $m\widehat{ABC}$



Find the value of x.

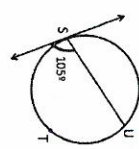


Angle formed by 2 chords is equal to $1/2$ sum of intercepted arcs.
 Ex. $m\angle = 1/2 (80 + 20) = 50^\circ$

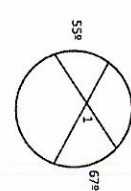
Geometry - Other Angle Relationships of Circles Worksheet

Find the indicated measure. Show your work.

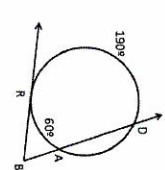
1. Find $m\widehat{STU}$



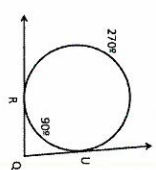
2. Find $m\angle I$



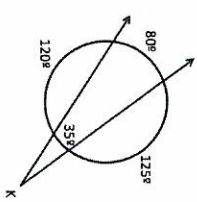
3. Find $m\angle DBR$



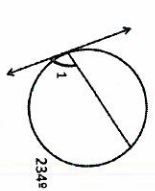
4. Find $m\angle RQU$



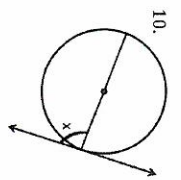
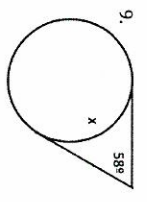
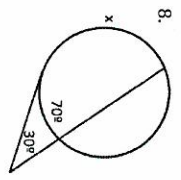
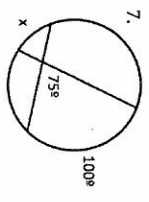
5. Find $m\angle K$



6. Find $m\angle I$

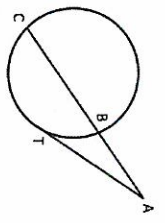


Solve for x . Show your work.



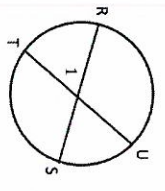
Use the figure on the right to complete the following problems.

- 11. If $m\widehat{CT} = 110$ and $m\widehat{BT} = 50$, find $m\angle A$.
- 12. If $m\angle A = 28$ and $m\widehat{BT} = 46$, find $m\widehat{CT}$.



Use the figure on the right to complete the following problems.

- 13. If $m\widehat{RT} = 80$ and $m\widehat{US} = 40$, find $m\angle I$.
- 14. If $m\widehat{RU} = 130$ and $m\widehat{TS} = 100$, find $m\angle I$.
- 15. If $m\angle I = 50$ and $m\widehat{RT} = 70$, find $m\widehat{US}$.
- 16. If $m\angle I = 52$ and $m\widehat{US} = 36$, find $m\widehat{RT}$.



Use the figure on the right to complete the following problems.

- 17. If $m\widehat{AG} = 100$ and $m\widehat{BH} = 20$, find $m\angle C$.
- 18. If $m\angle C = 25$ and $m\widehat{BH} = 25$, find $m\widehat{AG}$.
- 19. If $m\widehat{EH} = 95$ and $m\widehat{GE} = 25$, find $m\angle D$.
- 20. If $m\angle D = 40$ and $m\widehat{EH} = 138$, find $m\widehat{GE}$.

