

GEOMETRY



Name: _____ Class: _____

Topic: _____

Main Ideas/Questions	Notes/Examples
AREA & CIRCUMFERENCE <i>Formulas</i>	AREA FORMULA Directions: Find the area for 1.  3. 

Name: _____ Date: _____

Topic: _____ Class: _____

Main Ideas/Questions	Notes/Examples
CENTRAL ANGLES & Arc Measures	- A central angle is an angle with its vertex at the center of the circle and its two sides are radii. - For example: _____ is a central angle. - The sum of all central angles in a circle is 360°. - The measure of the arc formed by the central angle is the same as the measure of the central angle. 

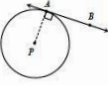
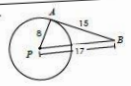
Name: _____ Date: _____

Topic: _____ Class: _____

Main Ideas/Questions	Notes/Examples
ARCS & ANGLES <i>Formed by Intersecting Chords, Secants, & Tangents</i>	When chords, secants, or tangents intersect at a point inside or outside a circle, angles are formed. The measure of each angle is equal to half the sum of the measures of the two arcs intercepted by the angle and its vertical angle.   

Name: _____ Date: _____

Topic: _____ Class: _____

Main Ideas/Questions	Notes/Examples
TANGENT LINES	- A tangent line intersects a circle at exactly one point, the point of tangency. - A line is tangent to a circle if and only if it is perpendicular to the radius drawn to the point of tangency.  Directions: Determine if $\overline{AB}$ is tangent to the circle. 1.  Directions: If $\overline{JK}$ is tangent to the circle, find $m\angle AED$. 3. 

Name: _____ Date: _____

Topic: _____ Class: _____

Main Ideas/Questions	Notes/Examples						
SEGMENT LENGTHS <i>Formed by Intersecting Chords, Secants, & Tangents</i>	<table border="1"><thead><tr><th>TYPE 1</th><th>TYPE 2</th><th>TYPE 3</th></tr></thead><tbody><tr><td>Intersecting chords (or secants) inside the circle. </td><td>Intersecting secants outside the circle. </td><td>Intersecting secant and tangent outside the circle. </td></tr></tbody></table>	TYPE 1	TYPE 2	TYPE 3	Intersecting chords (or secants) inside the circle. 	Intersecting secants outside the circle. 	Intersecting secant and tangent outside the circle. 
TYPE 1	TYPE 2	TYPE 3					
Intersecting chords (or secants) inside the circle. 	Intersecting secants outside the circle. 	Intersecting secant and tangent outside the circle. 					

CIRCLES

NOTES • HOMEWORK • QUIZZES • TEST

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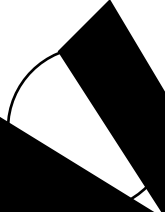
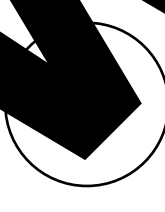
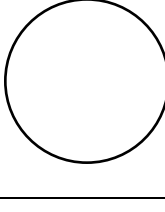
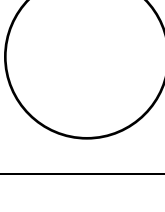
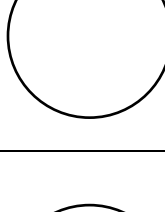
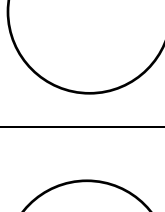
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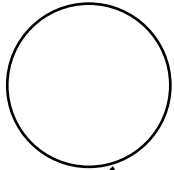
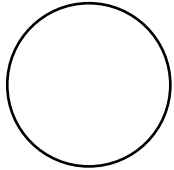
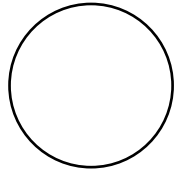
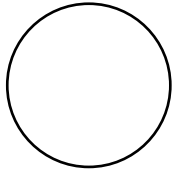


Unit 10 - Circles: Sample Unit Outline

	TOPIC	HOMEWORK
DAY 1	Parts of Circles	HW #1
DAY 2	Area and Circumference of Circles	HW #2
DAY 3	Central Angles & Arc Measures	HW #3
DAY 4	Arc Lengths	HW #3
DAY 5	Quiz 10-1	
DAY 6	Congruent Chords and Arcs	HW #4
DAY 7	Inscribed Angles	HW #5
DAY 8	Tangents	HW #6
DAY 9	Quiz 10-2	None
DAY 10	Angles formed by Chords, Secants, and Tangents (Day 1 – Basic)	HW #7
DAY 11	Angles formed by Chords, Secants, and Tangents (Day 2 – with Algebra)	↓
DAY 12	Segment Lengths formed by Chords, Secants, and Tangents	HW #8
DAY 13	Quiz 10-3	None
DAY 14	Equations of Circles (Day 1- Standard Form, Graphing, Identifying Parts, Completing the Square)	HW #9
DAY 15	Equations of Circles (Day 2- Writing Equations in Standard Form, Identifying Parts, Finding Center/radius, center/diameter, etc.)	HW #10
DAY 16	Unit 10 Review	Study for Test
DAY 17	UNIT 10 TEST	None
ADDITIONAL RESOURCES: Video Links & Google Slides Suggested Activities		

PARTS OF CIRCLES DICTIONARY

Term	Definition	Example or Visual
CIRCLE		
RADIUS		
CHORD		
DIAMETER		
SECANT		
TANGENT		
POINT OF TANGENCY		

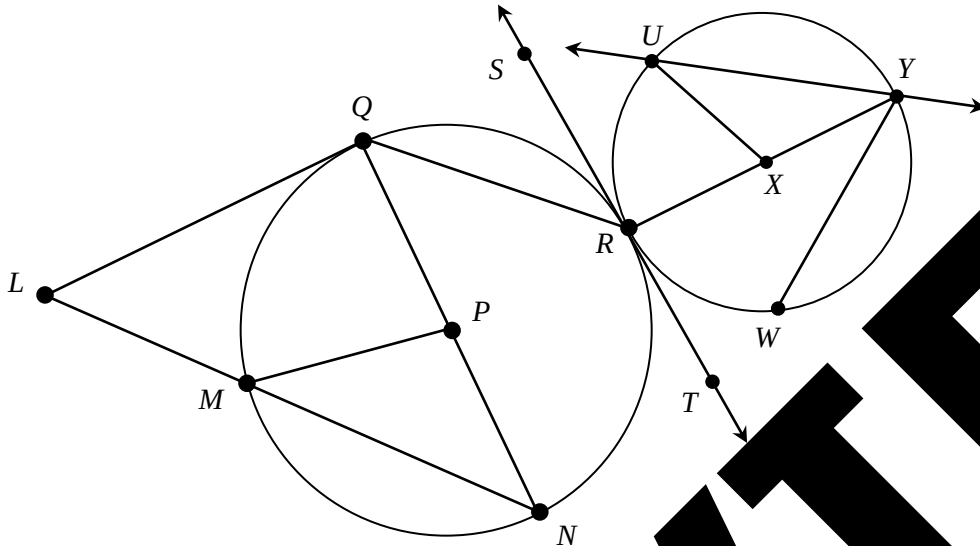
CENTRAL ANGLE		
INSCRIBED ANGLE		
ARC		
MINOR ARC		
MAJOR ARC		
SEMICIRCLE		

Formulas

AREA	CIRCUMFERENCE	ARC LENGTH

Name that Circle Part!

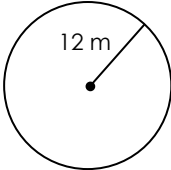
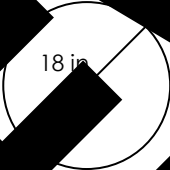
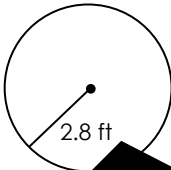
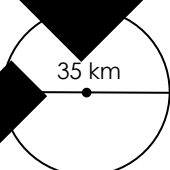
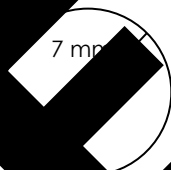
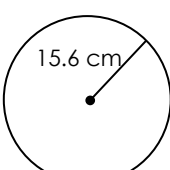
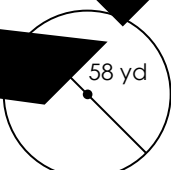
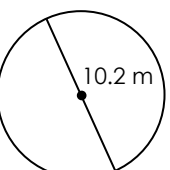
Directions: Use the diagram below along with the bank to classify each circle part. Parts may be used more than once.



Part	Circle
Radius	
Chord	
Secant	
Tangent	
Point of Tangency	
Minor Arc	
Major Arc	
Semicircle	
Central Angle	
Inscribed Angle	

1. $\overline{LQ}$ _____
2. $\overline{WY}$ _____
3. $\angle NQR$ _____
4. _____
5. $\widehat{RWU}$ _____
6. $\overleftrightarrow{ST}$ _____
7. $\overline{PN}$ _____
8. $\angle UXY$ _____
9. $\widehat{MQ}$ _____
10. $\overline{QN}$ _____
11. _____
12. $\overleftrightarrow{UY}$ _____
13. _____
14. $\angle MPQ$ _____
15. $\overline{QR}$ _____
16. $\angle UYR$ _____
17. $\widehat{WY}$ _____
18. $\overline{LN}$ _____
19. $\overline{UX}$ _____
20. $\widehat{RUY}$ _____

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples	
Area & Circumference Formulas	AREA FORMULA	CIRCUMFERENCE FORMULA
	Directions: Find the area for circles 1-4 and circumference for circles 5-8.	
	1. 	2. 
	3. 	4. 
	5. 	6. 
	7. 	8. 
Finding a RADIUS OR DIAMETER	9. Find the diameter of a circle with a circumference of 65.97 meters.	10. Find the radius of a circle with a circumference of 21.99 feet.

WORKING
BETWEEN
FORMULAS

11. Find the radius of a circle with a circumference of 35π yards.

12. Find the radius of a circle with an area of 380.13 square inches.

13. Find the diameter of a circle with an area of 615.75 cm^2 .

14. Find the diameter of a circle with an area of 25π square feet.

15. Find the area of a circle with a circumference of 20π meters.

16. Find the circumference of a circle with an area of $289\pi \text{ mm}^2$.

17. Find the circumference of a circle with an area of 113.1 in^2 .

18. Find the area of a circle with a circumference of 131.95 meters.

19. Find the area of a circle with a circumference of 18.84 yards.

20. Find the circumference of a circle with an area of 1,809.56 square centimeters.

Name: _____

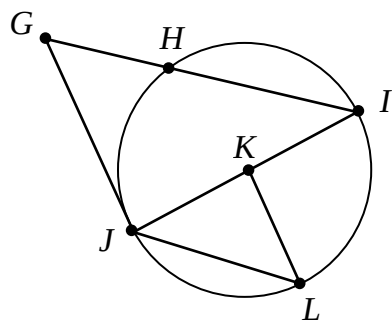
Unit 10: Circles

Date: _____ Per: _____

Homework 1: Parts of Circles;
Area & Circumference

**** This is a 2-page document! ****

1. Give an example of each circle part using the diagram below.



a) Center: _____

h) Minor Arc: _____

b) Radius: _____

i) Major Arc: _____

c) Chord: _____

j) Inscribed Angle: _____

d) Diameter: _____

k) Central Angle: _____

e) Secant: _____

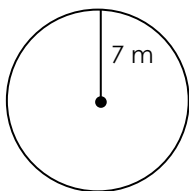
l) Inscribed Angle: _____

f) Tangent: _____

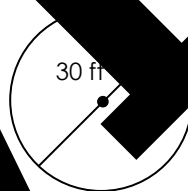
g) Point of Tangency: _____

Directions: Find the area and circumference of each circle below.

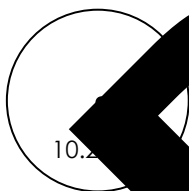
2.



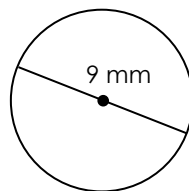
3.



4.



5.



The radius of Circle A is three feet less than twice the diameter of Circle B. If the sum of the perimeters of both circles is 49 feet, find the area and circumference of Circle A.

Directions: Use the area and circumference formulas to find the radius or diameter.

7. Find the radius of a circle with an area of 615.75 square kilometers.

8. Find the diameter of a circle with a circumference of 15.71 yards.

9. Find the diameter of a circle with an area of 415.48 square inches.

10. Find the radius of a circle with a circumference of 14 feet.

11. Find the diameter of a circle with an area of 240.25π square millimeters.

12. Find the radius of a circle with a circumference of 45π centimeters.

Directions: Use the information given to find the area or circumference.

13. Find the area of a circle with a circumference of 10π feet.

14. Find the circumference of a circle with an area of 676π square millimeters.

15. Find the circumference of a circle with an area of 1,134.11 square meters.

16. Find the area of a circle with a circumference of 53.41 inches.

Name:

Date:

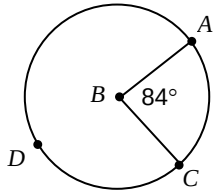
Topic:

Class:

Main Ideas/Questions

Notes/Examples

CENTRAL ANGLES

& Arc Measures

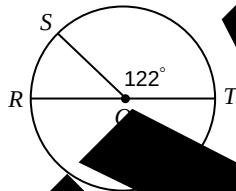
- A **central angle** is an angle with its vertex at the _____ of the circle and its two sides are _____.
- For example:** _____ is a central angle in _____.
- The sum of all central angles in a circle is _____.
- The **measure of the arc** formed by the endpoints of a central angle is _____.

$$m\widehat{AC} = \text{_____} = \text{_____}$$

EXAMPLES

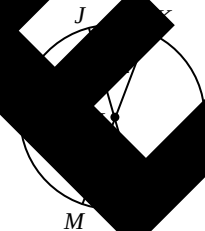
Directions: Find each angle and arc measure.

1.



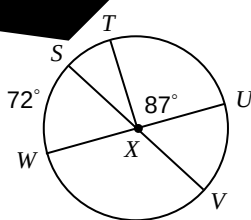
$$\begin{aligned} m\widehat{ST} &= \text{_____} \\ m\widehat{RS} &= \text{_____} \\ m\widehat{SRT} &= \text{_____} \end{aligned}$$

2.



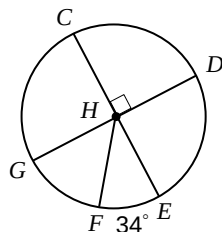
$$\begin{aligned} m\widehat{JK} &= \text{_____} \\ m\angle JNM &= \text{_____} \\ m\widehat{KL} &= \text{_____} \\ m\widehat{JKM} &= \text{_____} \\ m\widehat{MKL} &= \text{_____} \end{aligned}$$

3.



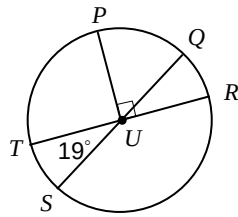
$$\begin{aligned} m\angle UXV &= \text{_____} \\ m\widehat{ST} &= \text{_____} \\ m\widehat{WV} &= \text{_____} \\ m\widehat{TW} &= \text{_____} \\ m\widehat{TVW} &= \text{_____} \end{aligned}$$

4.



$$\begin{aligned} m\widehat{CD} &= \text{_____} \\ m\widehat{FD} &= \text{_____} \\ m\widehat{DCF} &= \text{_____} \\ m\widehat{GDF} &= \text{_____} \end{aligned}$$

5.



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

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

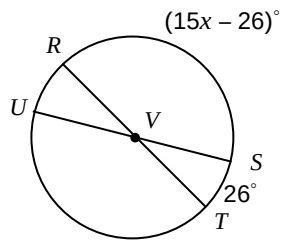
$$m\widehat{QRT} = \underline{\hspace{2cm}}$$

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

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

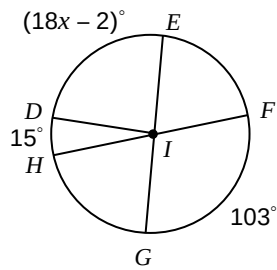
Directions: Find each value or measure.

6.



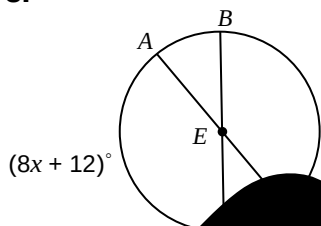
$$x = \underline{\hspace{2cm}}$$

7.



$$x = \underline{\hspace{2cm}}$$

8.



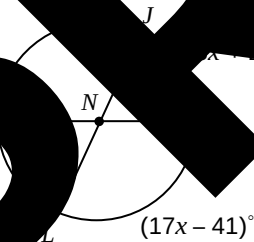
$$x = \underline{\hspace{2cm}}$$

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

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

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

9.



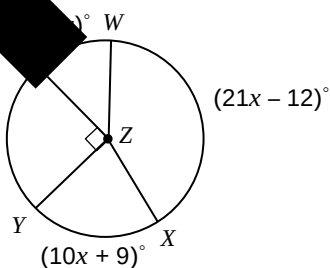
$$x = \underline{\hspace{2cm}}$$

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

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

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

10.



$$x = \underline{\hspace{2cm}}$$

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

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

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

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

Name: _____

Unit 10: Circles

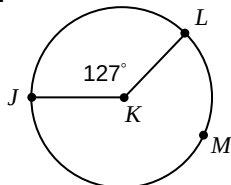
Date: _____ Per: _____

Homework 2: Central Angles & Arc Measures

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Directions: Find the following arc measures.

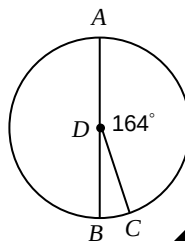
1.



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

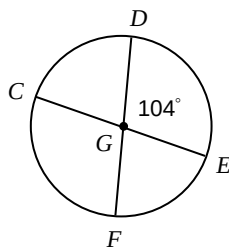
$$m\widehat{JML} = \underline{\hspace{2cm}}$$

2.



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

3.



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

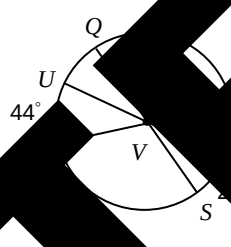
$$m\widehat{FE} = \underline{\hspace{2cm}}$$

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

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

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

4.



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

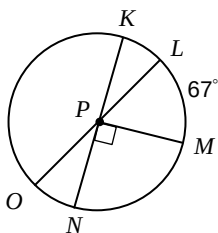
$$m\widehat{QR} = \underline{\hspace{2cm}}$$

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

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

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

5.



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

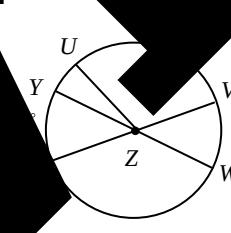
$$m\widehat{LOM} = \underline{\hspace{2cm}}$$

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

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

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

6.



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

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

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

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

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

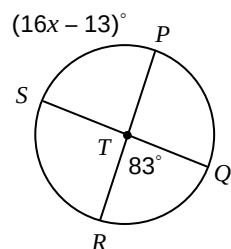
Directions: Find the value of x.

7.



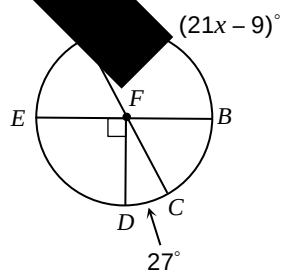
$$x = \underline{\hspace{2cm}}$$

8.

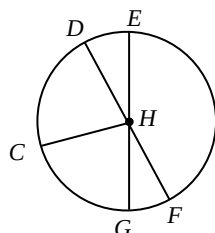


$$x = \underline{\hspace{2cm}}$$

10. Given: $\overline{CH}$ bisects $\angle DHG$,
 $m\widehat{GF} = (2x + 6)^\circ$, and $m\widehat{DC} = (7x - 1)^\circ$.

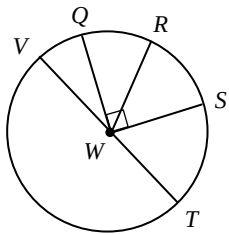


$$x = \underline{\hspace{2cm}}$$



$$x = \underline{\hspace{2cm}}$$

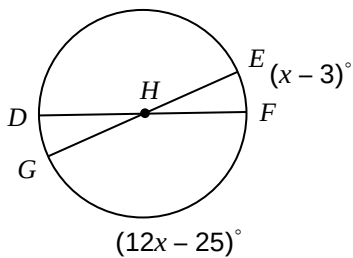
11. If $m\widehat{VQ} = (y + 7)^\circ$, $m\widehat{QR} = (x + 11)^\circ$, $m\widehat{RS} = (3y)^\circ$, and $m\widehat{ST} = 65^\circ$, find the values of x and y .



$$x = \underline{\hspace{2cm}}$$

Directions: Find the value of x and each arc measure.

12.



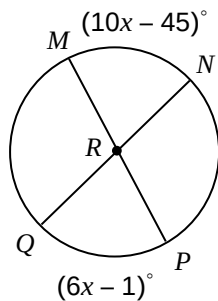
$$x = \underline{\hspace{2cm}}$$

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

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

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

13.



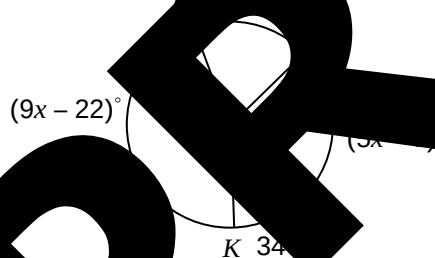
$$x = \underline{\hspace{2cm}}$$

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

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

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

14.



$$x = \underline{\hspace{2cm}}$$

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

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

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

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

$$x = \underline{\hspace{2cm}}$$

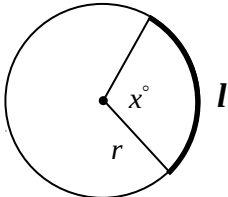
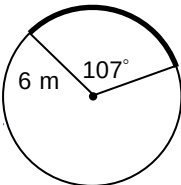
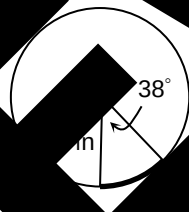
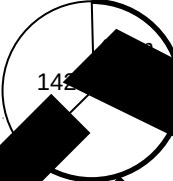
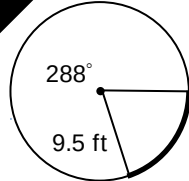
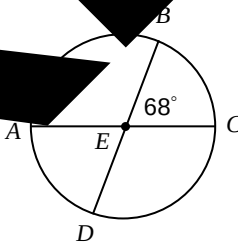
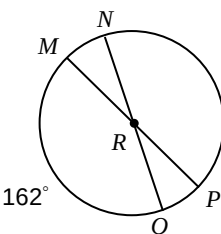
$$m\widehat{AD} = \underline{\hspace{2cm}}$$

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

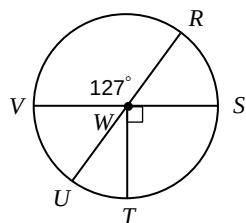
$$m\widehat{DC} = \underline{\hspace{2cm}}$$

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

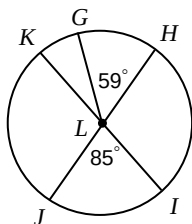
Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
ARC LENGTH 	The length of an arc is a portion of the circumference.
	Arc Length Formula: $x =$ _____ measure of arc $C = c$ _____
	Directions: Find the length of each bolded arc to the nearest hundredth.
	1.  2. 
	3.  
	5. If $AB = 10$ centimeters, find the length of $\widehat{CD}$. 
	6. If $NR = 8$ feet, find the length of $\widehat{NMP}$. 

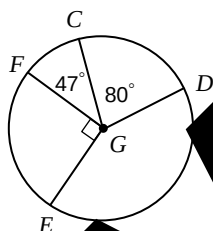
7. If $VS = 12$ meters, find the length of $\widehat{UT}$.



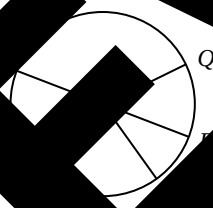
8. If $JH = 21$ inches, find the length of $\widehat{KJG}$.



9. If $FG = 27$ yards, find the length of $\widehat{CD}$.



10. If $WS = 10$ meters, find the length of $\widehat{TS}$.



11. A 10-foot pendulum swings through an angle of 40° . How far does the tip of the pendulum travel in a single swing?

12. A car entered a roundabout from Mason Avenue, traveled 280 feet, then turned onto Perry Street. If the roundabout has a diameter of 150 feet, find the angle of rotation to the nearest degree the car traveled.

Name: _____

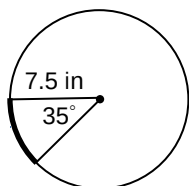
Unit 10: Circles

Date: _____ Per: _____

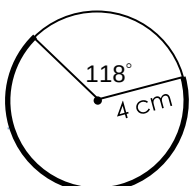
Homework 3: Arc Lengths

Directions: Find the length of each bolded arc. Round to the nearest hundredth.

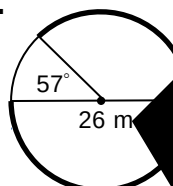
1.



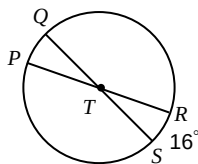
2.



3.



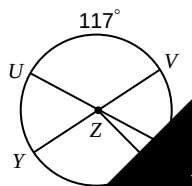
4. If $TR = 11$ ft, find the length of $\widehat{PS}$.



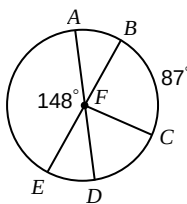
5. If $MK = 10$, find the length of $\widehat{MKL}$.



6. If $YV = 28$ in, find the length of $\widehat{UV}$.



7. If $AF = 23$ cm, find the length of $\widehat{EC}$.



The minute hand of a clock is 9 centimeters long. How far does the tip of the hand travel through an arc of 252° in 42 minutes. To the nearest tenth of a centimeter, how far does the minute hand travel during a 42-minute period?

9. A Ferris wheel has a diameter of 225 feet. If a passenger gets in a car and travels 38 feet when the wheel stops to let more passengers on, find the angle of rotation to the nearest degree.

Name: _____

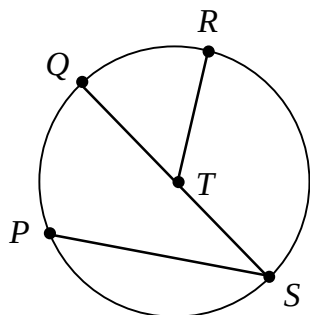
Geometry

Date: _____ Per: _____

Unit 10: Circles

Quiz 10-1: Intro to Circles, Central Angles & Arcs, Arc Lengths

Use the circle below for questions 1 – 7.



1. Name a radius.

2. Name a diameter.

3. Name a chord that is not a diameter.

4. Name a central angle.

5. Name a minor arc.

6. Name a major arc.

7. Name a semi-circle.

1. _____

2. _____

3. _____

4. _____

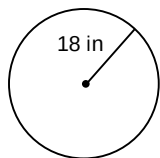
5. _____

6. _____

7. _____

For questions 8 and 9, find the area and circumference. Round to the nearest hundredth.

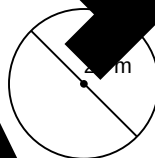
8.



A = _____

C = _____

9.



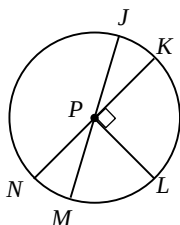
A = _____

C = _____

10. If the area of a circle is 201.06 cm^2 , find its diameter and circumference. $d =$ _____

$C =$ _____

11. If $\angle MPL = 63^\circ$, find each measure.



a) $m\widehat{JK} =$ _____

d) $m\widehat{KNM} =$ _____

b) $m\widehat{NJ} =$ _____

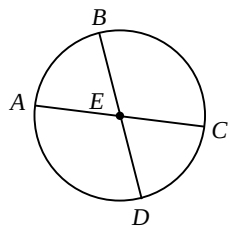
e) $m\widehat{MJL} =$ _____

c) $m\widehat{JL} =$ _____

f) $m\widehat{JLK} =$ _____

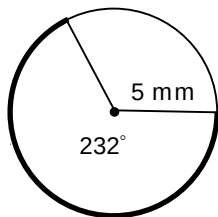
12. If $m\widehat{AD} = (19x - 49)^\circ$ and $m\widehat{CD} = (5x + 37)^\circ$, find $m\widehat{CD}$.

12. $m\widehat{CD} =$ _____

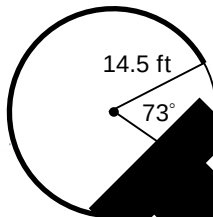


For questions 13 and 14, find the length of each bolded arc. Round the final answer to the nearest hundredth.

13.



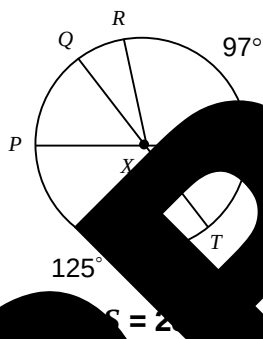
14.



13. _____

14. _____

15. Using the circle below, find each arc length to the nearest hundredth.



a) _____

b) $\widehat{RPT}$ _____

A merry-go-round has a radius of 18 feet. If a passenger gets on a horse located at the edge of the wheel and travels 38 feet, find the angle of rotation to the nearest degree.

16. _____

Name:

Date:

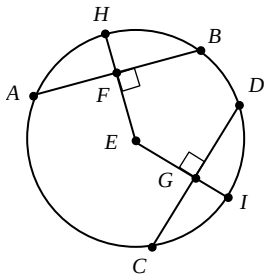
Topic:

Class:

Main Ideas/Questions

Notes/Examples

Congruent
CHORDS & ARCS



- Two chords are congruent if and only if:

a) _____

_____ $\leftrightarrow$ _____

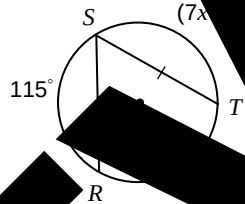
b) _____

_____ $\leftrightarrow$ _____

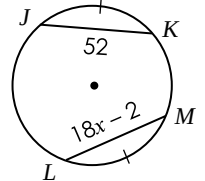
- If a diameter or radius is _____ a chord, then it _____ the _____ and its _____.

Directions: Find the indicated value.

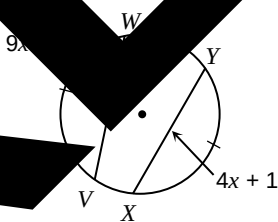
1. Find x .



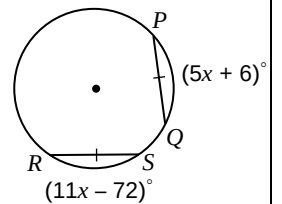
2. Find



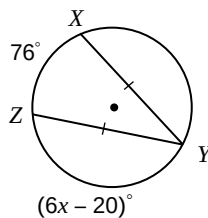
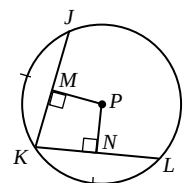
3. Find XY .



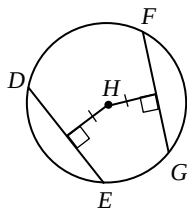
4. Find $m\widehat{RS}$.



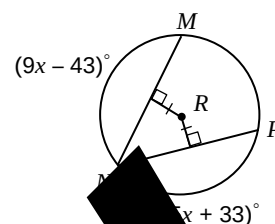
6. If $MP = 5x - 34$ and $PN = 2x - 4$, find MP .



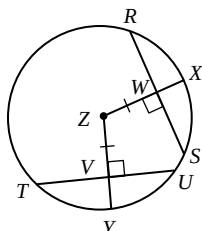
7. If $DE = 11x + 15$ and $FG = 32x - 27$, find DE .



8. Find $m\widehat{MP}$.

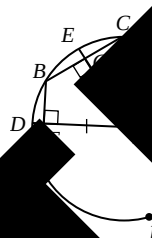


9. In circle Z, if $RS = 18$, and $m\widehat{TY} = 42^\circ$, find each measure.



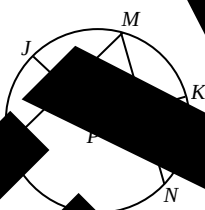
$TV = \underline{\hspace{2cm}}$
 $TU = \underline{\hspace{2cm}}$
 $WS = \underline{\hspace{2cm}}$
 $m\widehat{YU} = \underline{\hspace{2cm}}$
 $m\widehat{RS} = \underline{\hspace{2cm}}$

10. In circle I, if $BC = 256$, and $m\widehat{AB} = 256^\circ$, find each measure.

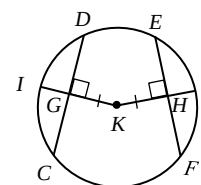


$DE = \underline{\hspace{2cm}}$
 $m\widehat{AB} = \underline{\hspace{2cm}}$
 $m\widehat{BC} = \underline{\hspace{2cm}}$
 $m\widehat{EC} = \underline{\hspace{2cm}}$

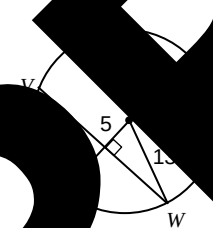
11. If $QM = 6x - 11$ and $MR = 2x + 9$, find MN .



12. If $m\widehat{DE} = (7x - 15)^\circ$ and $m\widehat{EF} = (12x - 8)^\circ$, find $m\widehat{DF}$.

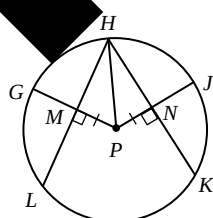


Use the circle below for questions 13 and 14.



14. Find $m\widehat{YW}$.

Use the circle below for questions 15 and 16.



15. Find PH .

16. Find $m\widehat{GJ}$.

$HK = 30$ and $PM = 8$

Name: _____

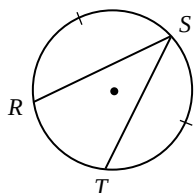
Unit 10: Circles

Date: _____ Per: _____

Homework 4: Congruent Chords & Arcs

**** This is a 2-page document! ******Directions:** Find each value or measure.

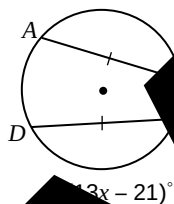
1. If
- $RS = 59$
- and
- $ST = 10x - 31$
- , find
- x
- .



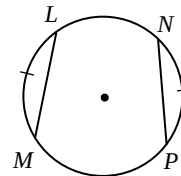
2. If
- $m\widehat{JK} = (7x - 39)^\circ$
- and
- $m\widehat{ML} = 87^\circ$
- , find
- x
- .



3. If
- $m\widehat{AD} = 85^\circ$
- and
- $m\widehat{BC} = 31^\circ$
- , find the value of
- x
- .



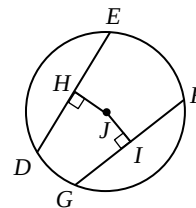
4. If
- $m\widehat{LM} = 41^\circ$
- and
- $m\widehat{NP} = 5^\circ$
- , find
- LM
- .



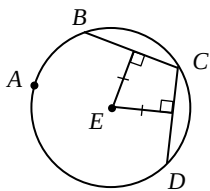
5. If
- $m\widehat{UV} = (8x - 17)^\circ$
- and
- $m\widehat{WV} = 52^\circ$
- , find
- $m\widehat{WV}$
- .



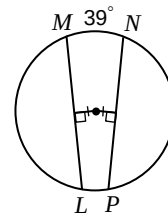
6. If
- $DE = GF$
- ,
- $HJ = 3x + 20$
- and
- $JI = 15x - 64$
- , find
- JI
- .



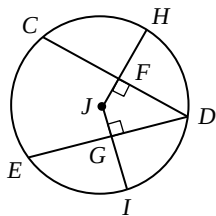
7. If
- $m\widehat{AB} = (9x - 53)^\circ$
- and
- $m\widehat{CD} = (2x + 45)^\circ$
- , find
- $m\widehat{BAD}$
- .



8. If
- $m\widehat{LM} = (8x - 56)^\circ$
- and
- $m\widehat{NP} = (5x + 22)^\circ$
- , find
- $m\widehat{LP}$
- .

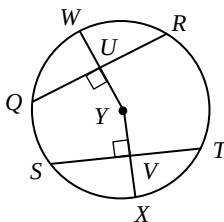


9. If $JG = JF$, $GD = 13$, and $m\widehat{CD} = 136^\circ$, find each measure.



$$\begin{aligned} ED &= \underline{\hspace{2cm}} \\ CF &= \underline{\hspace{2cm}} \\ m\widehat{ED} &= \underline{\hspace{2cm}} \\ m\widehat{HD} &= \underline{\hspace{2cm}} \\ m\widehat{CE} &= \underline{\hspace{2cm}} \end{aligned}$$

10. If $YU = YV$, $ST = 16$, $m\widehat{QS} = 34^\circ$, and $m\widehat{RT} = 98^\circ$, find each measure.

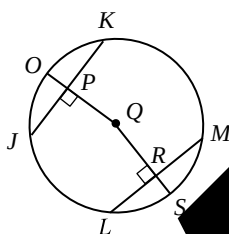


$$QU = \underline{\hspace{2cm}}$$

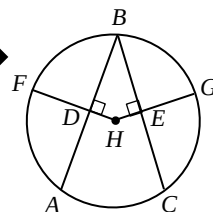
$$m\widehat{ST} = \underline{\hspace{2cm}}$$

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

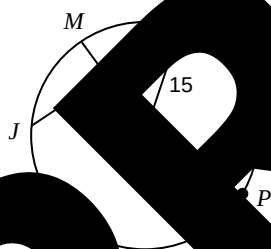
11. If $PQ = QR$, $JK = 3x + 23$ and $LM = 9x - 19$, find PK .



12. If $DH = 2$, $m\widehat{BG} = (x - 20)^\circ$ and $m\widehat{GC} = 70^\circ$, find $m\widehat{AB}$.



Use the circle below for questions 13 – 16.



13. Find JK .

14. Find $m\widehat{MK}$.

15. Find JK .

16. Find $m\widehat{JPK}$.

Name:

Date:

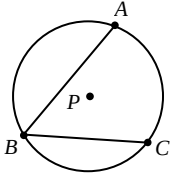
Topic:

Class:

Main Ideas/Questions

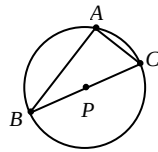
Notes/Examples

INSCRIBED ANGLES



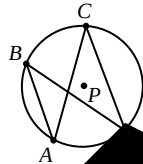
$$m\angle ABC = \underline{\hspace{2cm}}$$

- An **inscribed angle** is an angle with its vertex _____ the circle with two sides that are _____.
- An **intercepted arc** is the arc that lies between the _____ of an inscribed angle.
- The **measure of the inscribed angle** is equal to _____ measure of its **intercepted arc**.

INTERCEPTING
a Diameter

If an inscribed angle intercepts a **diameter**, then it is a _____ angle.

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

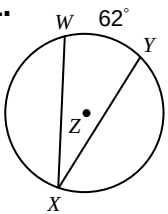
OVERLAPPING
Arcs

If two inscribed angles intercept the **same arc**, then the angles are _____.

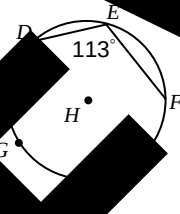
$$m\angle ABC = \underline{\hspace{2cm}}$$

Directions: Find each angle and arc measure.

1.

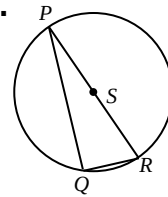


2.



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

3.



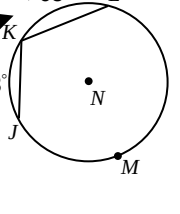
$$m\angle PQR = \underline{\hspace{2cm}}$$

4.



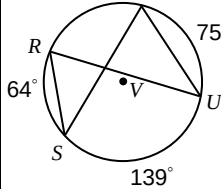
$$m\widehat{BC} = \underline{\hspace{2cm}}$$

5.



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

6.

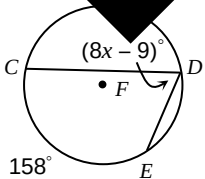


$$m\angle RST = \underline{\hspace{2cm}}$$

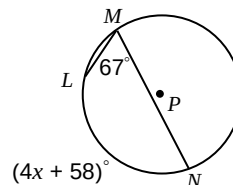
$$m\angle RUT = \underline{\hspace{2cm}}$$

Directions: Find each value or measure.

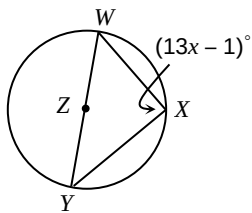
7. Solve for x.



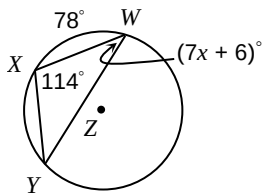
8. Solve for x.



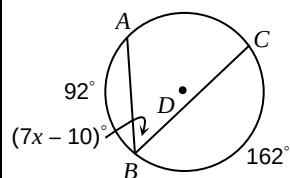
9. Solve for x .



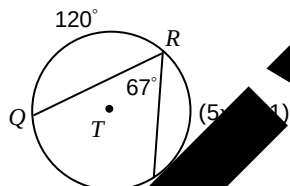
10. Solve for x .



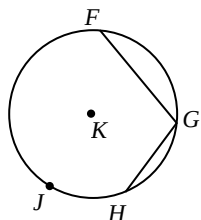
11. Solve for x .



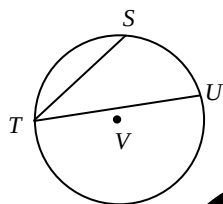
12. Solve for x .



13. If $m\angle FGH = (6x + 21)^\circ$ and $m\widehat{FJH} = (17x - 28)^\circ$, find $m\widehat{FJH}$.



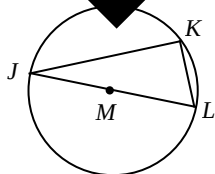
14. If $m\angle STU = (5x - 16)^\circ$ and $m\widehat{STU} = (x + 1)^\circ$, find $m\angle STU$.



15. If $m\angle ACD = (6x + 2)^\circ$ and $m\angle ACD = (13x - 9)^\circ$, find $m\widehat{AD}$.



16. If $m\angle KJL = (3x + 2)^\circ$ and $m\angle KLJ = (7x - 32)^\circ$, find $m\widehat{KL}$.



Name:

Date:

Topic:

Class:

Main Ideas/Questions

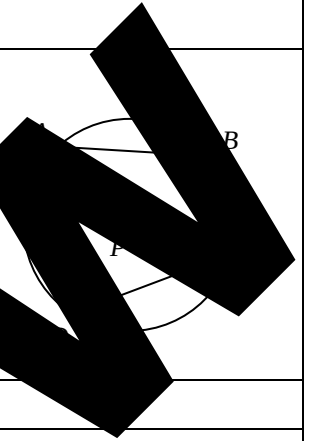
Notes/Examples

Inscribed QUADRILATERALS

If a **quadrilateral** is inscribed in a circle, then its **opposite angles** are _____.

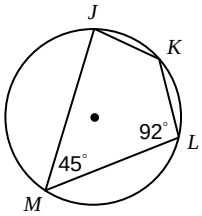
In circle P to the right:

_____ and _____



Directions: Find each value or measure.

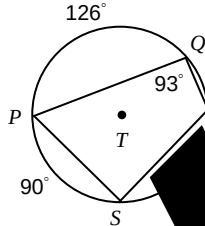
1.



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

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

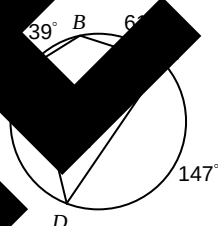
2.



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

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

3.

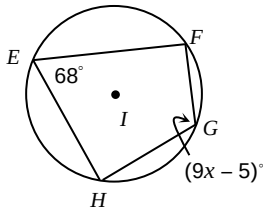
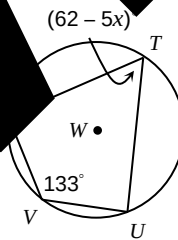
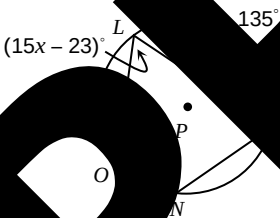
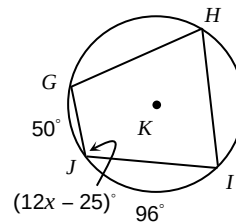
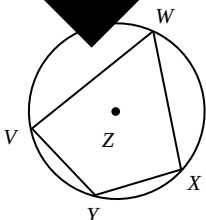


$$m\angle A = \underline{\hspace{2cm}}$$

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

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

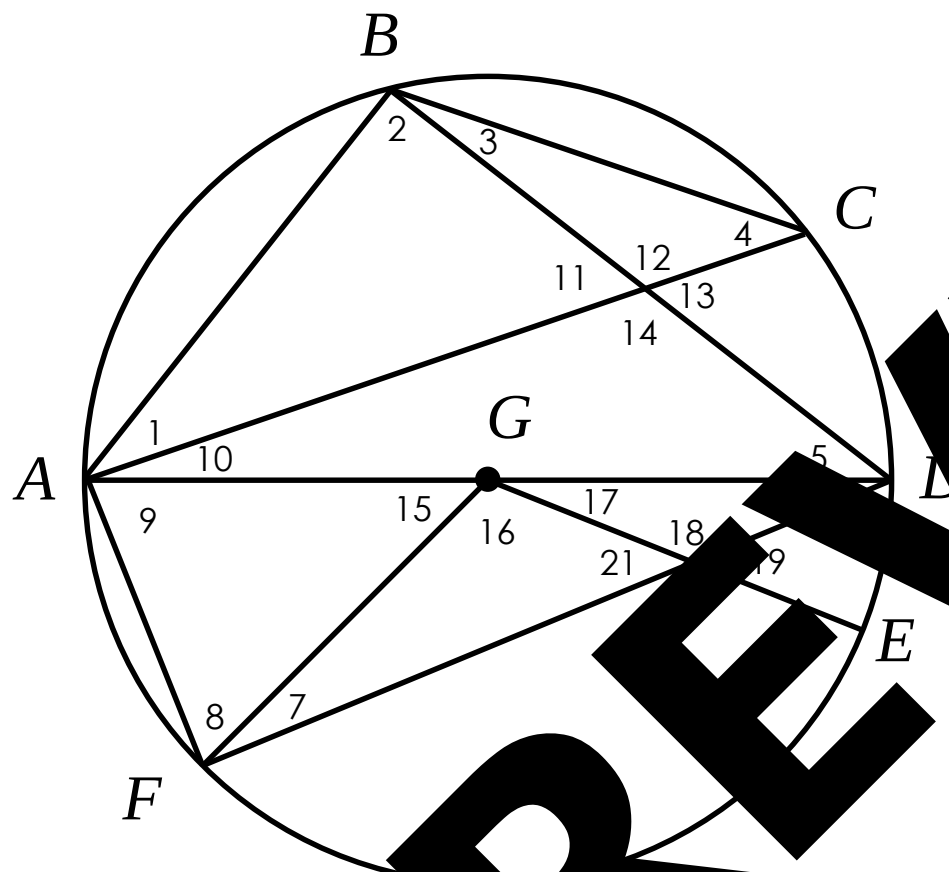
$$m\angle D = \underline{\hspace{2cm}}$$

4. Solve for x .Solve for x .6. Solve for x .7. Solve for x .8. If $m\angle X = (5x + 1)^\circ$ and $m\angle Y = (13x - 37)^\circ$, find $m\angle Y$.

The Giant CIRCLE CHALLENGE!

Name: _____

Date: _____ Period: _____



Given: G is the center of the circle
 $\overline{AD}$ is a diameter, $m\widehat{AB} = 78^\circ$,
 $m\widehat{AC} = 105^\circ$, $m\widehat{ED} = 27^\circ$, $m\widehat{CD} = 42^\circ$

Find each angle measure:

- | | |
|----------------------|----------------------|
| $m\angle 1 =$ _____ | $m\angle 12 =$ _____ |
| $m\angle 2 =$ _____ | $m\angle 13 =$ _____ |
| $m\angle 3 =$ _____ | $m\angle 14 =$ _____ |
| $m\angle 4 =$ _____ | $m\angle 15 =$ _____ |
| $m\angle 5 =$ _____ | $m\angle 16 =$ _____ |
| $m\angle 6 =$ _____ | $m\angle 17 =$ _____ |
| $m\angle 7 =$ _____ | $m\angle 18 =$ _____ |
| $m\angle 8 =$ _____ | $m\angle 19 =$ _____ |
| $m\angle 9 =$ _____ | $m\angle 20 =$ _____ |
| $m\angle 10 =$ _____ | $m\angle 21 =$ _____ |
| $m\angle 11 =$ _____ | |

Name: _____

Unit 10: Circles

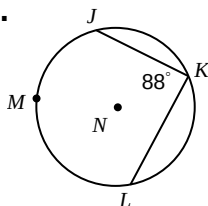
Date: _____ Per: _____

Homework 5: Inscribed Angles

** This is a 2-page document! **

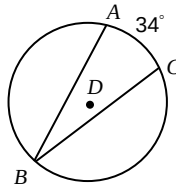
Directions: Find each angle or arc measure.

1.



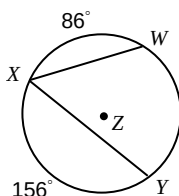
$$m\widehat{JML} = \underline{\hspace{2cm}}$$

2.



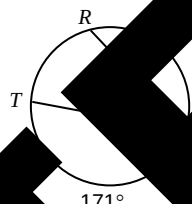
$$m\angle A = \underline{\hspace{2cm}}$$

3.



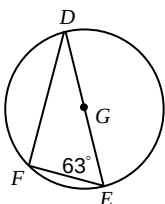
$$m\angle WXY = \underline{\hspace{2cm}}$$

4.



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

5.



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

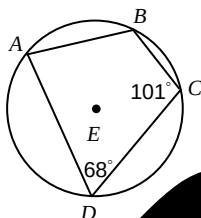
6.



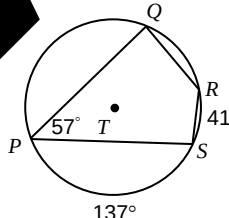
$$m\angle GHJ = \underline{\hspace{2cm}}$$

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

7.



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



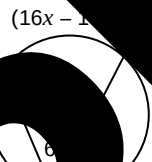
$$m\angle Q = \underline{\hspace{2cm}}$$

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

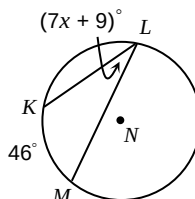
$$m\angle S = \underline{\hspace{2cm}}$$

Directions: Find the value of x .

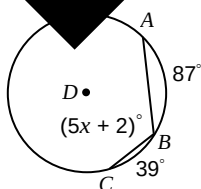
9.



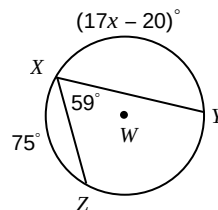
10.



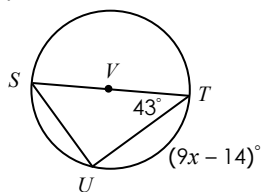
11.



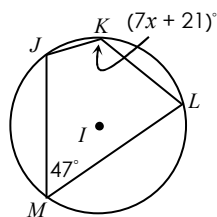
12.



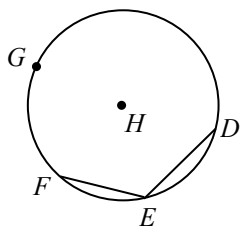
13.



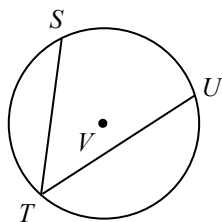
14.



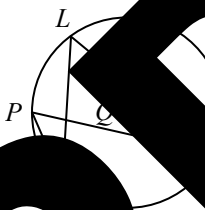
15. If $m\angle DEF = (6x + 37)^\circ$ and $m\widehat{FGD} = (19x - 31)^\circ$, find $m\angle DEF$.



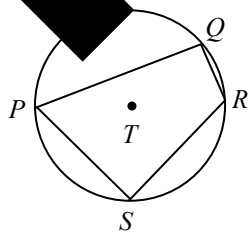
16. If $m\angle STU = (13x - 6)^\circ$, $m\widehat{SU} = (21x + 8)^\circ$, and $m\angle UT = 14^\circ$, find $m\angle STU$.



17. If $m\angle LMP = (5x - 19)^\circ$ and $m\angle MP = (x + 1)^\circ$, find $m\widehat{PL}$.



If $m\angle P = (4x - 1)^\circ$ and $m\angle R = (12x - 27)^\circ$, find $m\widehat{QPS}$.



Name:

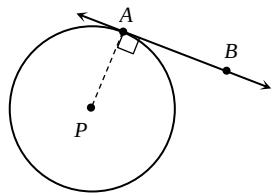
Date:

Topic:

Class:

Main Ideas/Questions

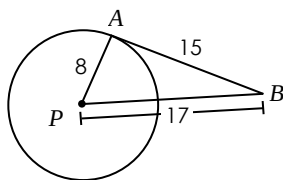
Notes/Examples

Tangent
LINES

- A **tangent line** intersects a circle at exactly _____ point, called the **point of tangency**.
- A line is tangent to a circle if and only if it is _____ to a _____ drawn to the point of tangency.

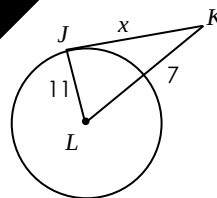
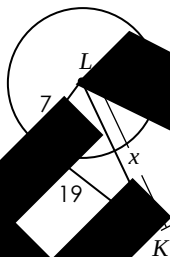
Directions: Determine if $\overline{AB}$ is tangent to circle P .

1.

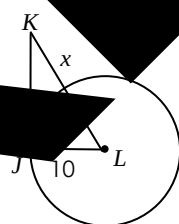


Directions: If $\overline{JK}$ is tangent to circle L , find x .

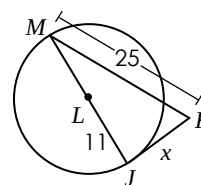
3.



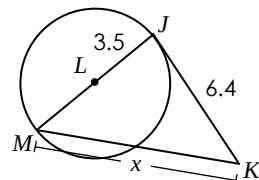
5.



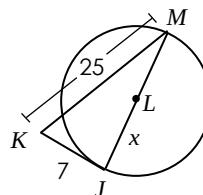
6.



7.

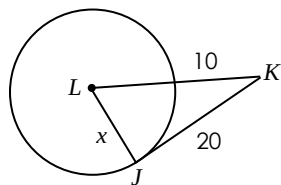


8.

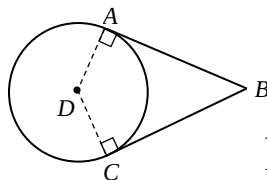


MORE
TANGENT LINE
Properties

9.

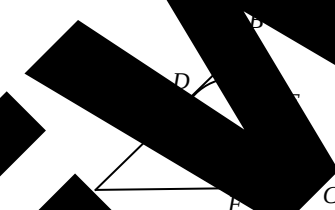


If two segments from the same external point are tangent to a circle, then they are congruent.



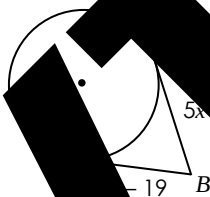
$$\overline{AB} \cong \overline{CB}$$

If a polygon is circumscribed around a circle, then the perimeter is equal to the sum of the lengths of the segments from each vertex to the points of tangency.

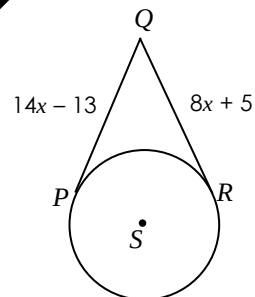


Directions: Find each value or measure. Assume that segments that appear to be tangent are tangent.

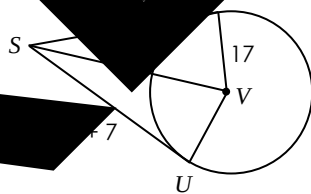
10. Find x .



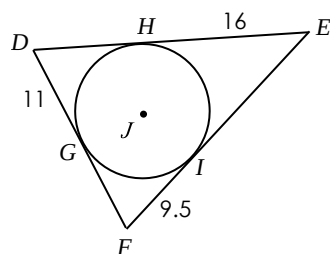
11. Find x .



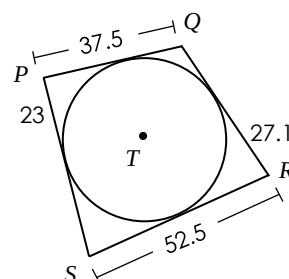
12. Find SV .



13. Find the perimeter of $\triangle DEF$.



14. Find the perimeter of quadrilateral $PQRS$.



Name: _____

Unit 10: Circles

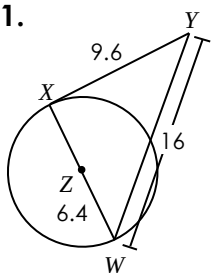
Date: _____ Per: _____

Homework 6: Tangent Lines

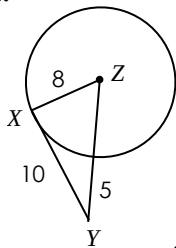
**** This is a 2-page document! ****

Determine if $\overline{XY}$ is tangent to circle Z.

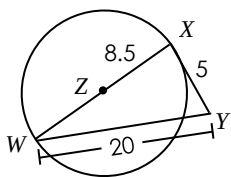
1.



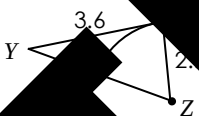
2.



3.

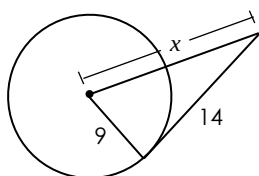


4.

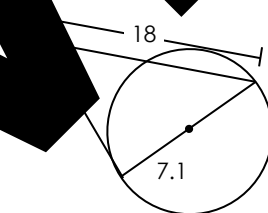


Find the value of x . Assume that segments that appear to be tangent are tangent.

5.



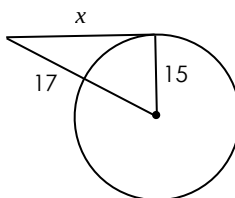
6.



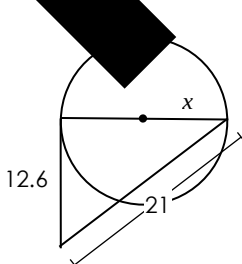
7.



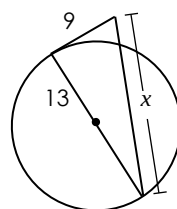
8.



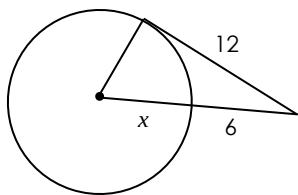
9.



10.

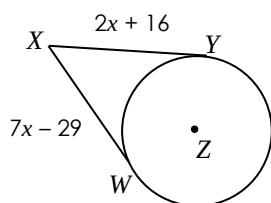


11.

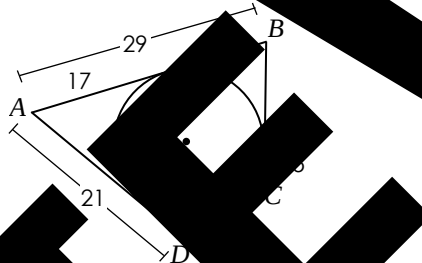


Find each value or measure. Assume that segments that appear to be tangent are tangent.

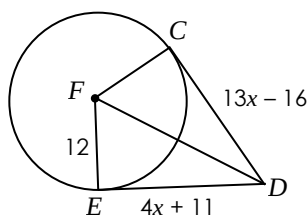
12. Find WX .



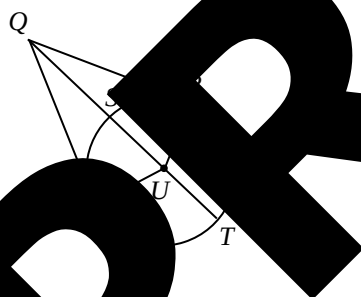
13. Find the perimeter of $ABCD$.



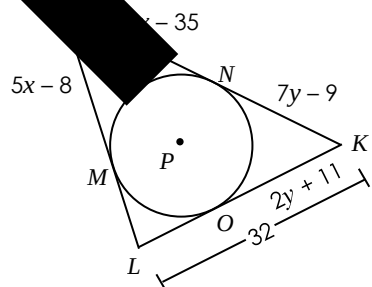
14. Find FD .



15. If $PQ = 4x + 2$, $QR = 7x - 1$, and $QU = 2$, find ST .



Find the perimeter of $\triangle JKL$.



Name: _____

Geometry

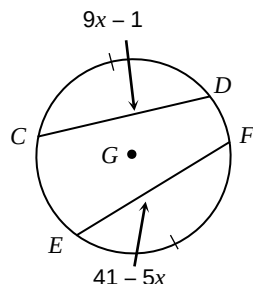
Date: _____ Per: _____

Unit 10: Circles

Quiz 10-2: Congruent Chords & Arcs, Inscribed Angles, & Tangent Lines

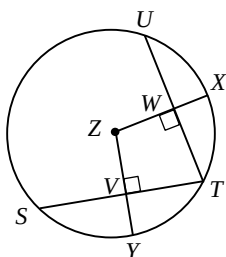
For questions 1 and 2, find each value or measure.

1. $EF =$ _____



2. $x =$ _____

3. In circle Z, if $VZ = ZW$, $SV = 21$, and $m\widehat{UT} = 112^\circ$, find each measure.



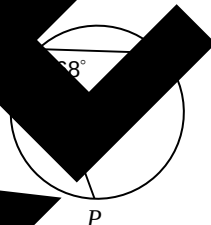
a) $SV =$ _____ d) $m\widehat{XT} =$ _____

b) $m\widehat{ST} =$ _____ e) $m\widehat{ST} =$ _____

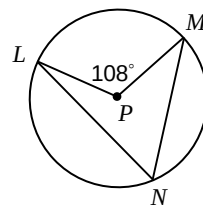
c) $SV =$ _____ f) $m\widehat{US} =$ _____

For questions 4-9, find each value or measure.

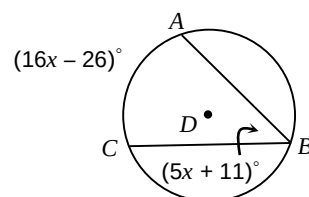
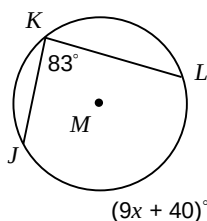
4. $m\widehat{RP} =$ _____



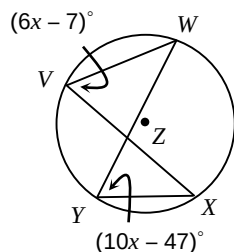
5. $m\angle LNM =$ _____



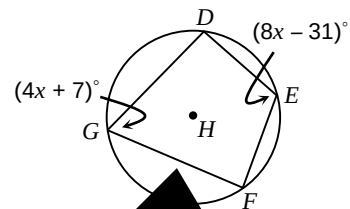
7. $m\angle ABC =$ _____



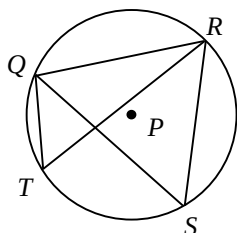
8. $m\widehat{WX} =$ _____



9. $m\angle DGF =$ _____



10. In circle P , if $m\widehat{QR} = 110^\circ$, $m\widehat{RS} = 94^\circ$, and $m\angle QRT = 27^\circ$, find each measure.



a) $m\angle QTR =$ _____

d) $m\angle TRS =$ _____

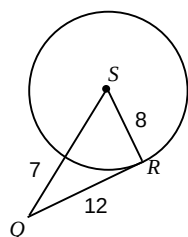
b) $m\angle RQS =$ _____

c) $m\angle QSP =$ _____

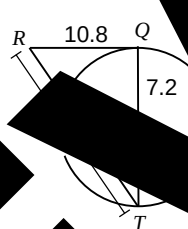
c) $m\widehat{TS} =$ _____

11. In which of the following diagrams is $\overline{QR}$ tangent to circle S ? Circle the best answer.

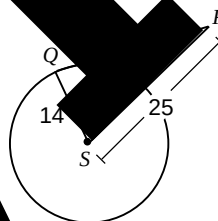
A.



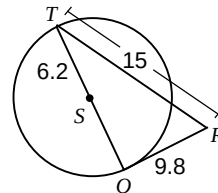
B.



C.

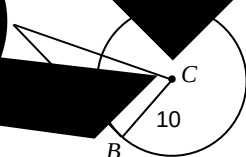


D.

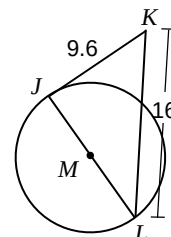


For questions 12-15, find each measure. Assume that all segments that appear to be tangent are tangent.

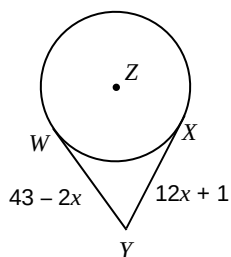
12. $AC =$ _____



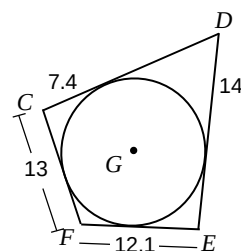
13. $ML =$ _____



14. _____



15. Perimeter of $CDEF =$ _____



So... how's your **ALGEBRA GAME?**

Many topics in this unit will require some of those sweet algebra skills. Need a refresher? Try these!

Set 1 Multi-Step Equations

Solve for x .

1. $8(x - 5) = 2(3x - 8)$

2. $167 - (7x + 3) = 108$

3. $\frac{3x + 15 + (11x - 5)}{2} = 47$

4. $8x - 7 = \frac{5}{2}(3x - 14)$

Set 2 Multiplying Binomials/FOIL

Find each product.

5. $(x + 8)(x - 1)$

6. $(3x - 5)(x + 6)$

7. $(5x - 2)(x + 3)$

8. $(2x + 1)(2x - 1)$

9. $(x + 9)(x - 4)$

10. $(4x + 3)^2$

Set 3 Factoring Polynomials**Factor each polynomial.**

11. $x^2 + 10x + 21$

12. $x^2 + 16x - 36$

13. $x^2 - 28x + 96$

14. $x^2 - 6x - 247$

15. $x^2 - 64$

16. $9x^2 - 1$

17. $4x^2 + 4x - 80$

18. $2x^2 - 13x + 6$

Set 4 Quadratic Equations**Solve for x.**

19. $x^2 - 9x + 20 = 0$

20. $x^2 + 6x = 135$

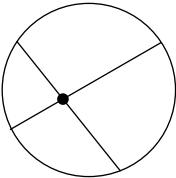
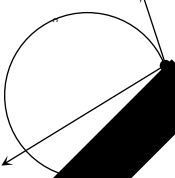
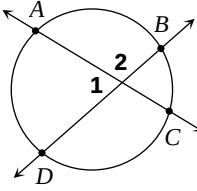
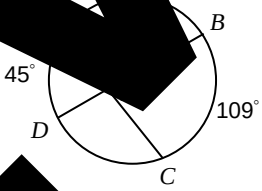
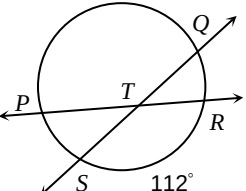
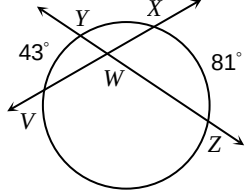
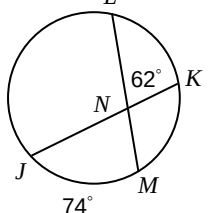
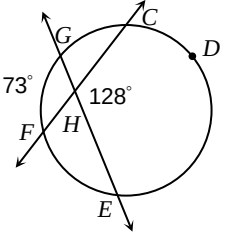
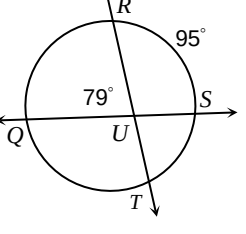
21. $x^2 - 9x - 24 = 0$

22. $x^2 = 12x - 36$

23. $(x - 1)(x - 4) = 6$

24. $2x^2 = 3x + 9$

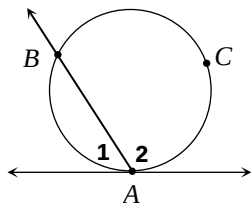
Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples		
ARCS & ANGLES <i>formed by Intersecting Chords, Secants, & Tangents</i>	When chords, secants, and tangents intersect in a circle (Figure 1) on a circle (Figure 2), or outside of a circle (Figure 3), special relationships exist between the angle and arc measures.		
	Figure 1 (inside the circle) 	Figure 2 (on the circle) 	Figure 3 (outside the circle) 
INTERIOR <i>Intersections</i>	If two secants or chords intersect inside a circle, then the measure of the angle formed is equal to half the sum of the measures of the intercepted arcs .		
		$m\angle 1 =$ _____ $m\angle 2 =$ _____	
	Find each measure.		
	1. $m\angle AFD$ 	2. $m\angle STR$ 	
	3. $m\angle YWX$ 	4. $m\widehat{LK}$ 	
	5. $m\widehat{CDE}$ 	6. $m\widehat{QT}$ 	

ON THE CIRCLE

Intersections

If a secant and a tangent intersect at the point of tangency, then the measure of each angle formed is equal to **half the measure of its intercepted arc**.

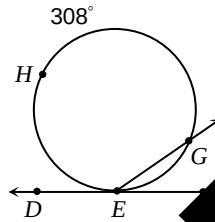


$$m\angle 1 = \underline{\hspace{2cm}}$$

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

Find each measure.

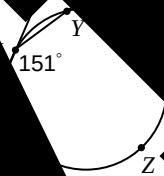
7. $m\angle DEG$



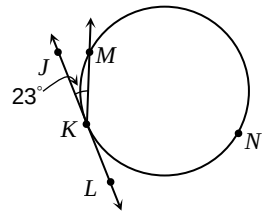
8. $m\angle DBA$



9. $m\widehat{XY}$



10. $m\angle JKL$

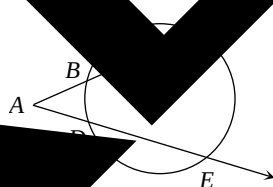


EXTERIOR

Intersections

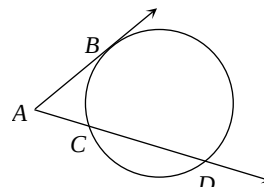
If two secants and/or tangents intersect on the exterior of a circle, then the measure of the angle formed is equal to **half the difference of the intercepted arcs**.

TWO SECANTS



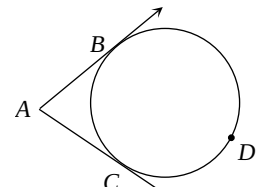
$$m\angle A = \underline{\hspace{2cm}}$$

SECANT & TANGENT



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

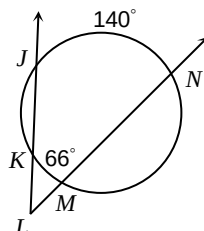
TWO TANGENTS



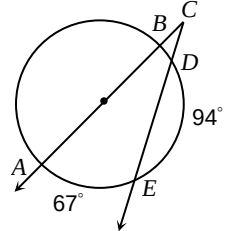
$$m\angle A = \underline{\hspace{2cm}}$$

Find each measure.

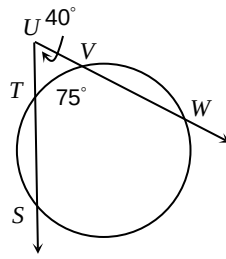
11. $m\angle KLM$



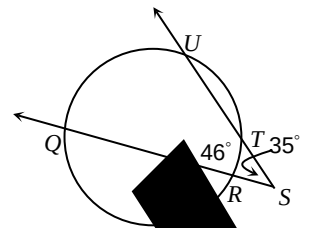
12. $m\angle BCD$



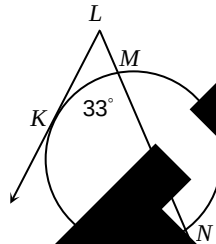
13. $m\widehat{SW}$



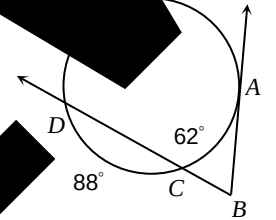
14. $m\widehat{QU}$



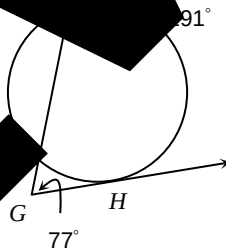
15. $m\angle KLM$



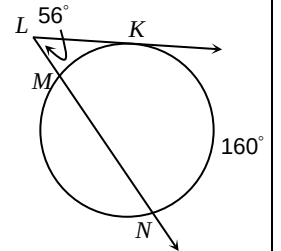
16. $m\widehat{ABC}$



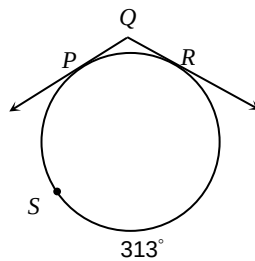
17. $m\widehat{GH}$



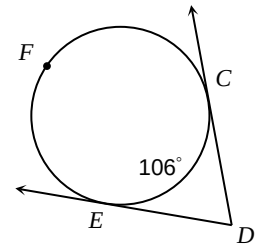
18. $m\widehat{MK}$



19. $m\angle PQR$



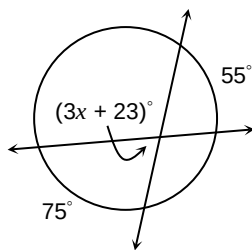
20. $m\angle CDE$



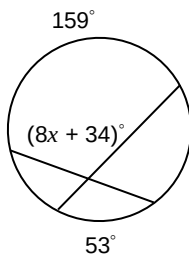
ARCS, ANGLES, & Algebra

Note: Assume that all segments that appear to be tangent are tangent.

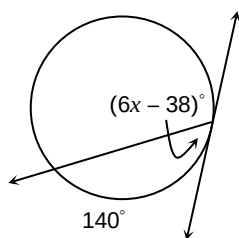
1. Solve for x .



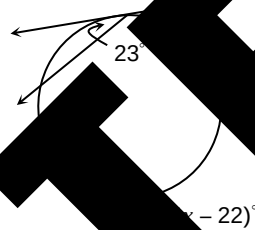
2. Solve for x .



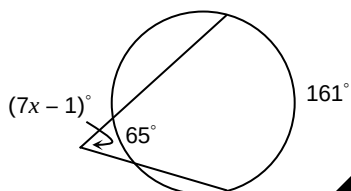
3. Solve for x .



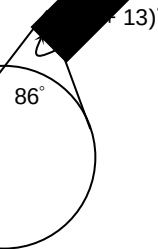
4. Solve for x .



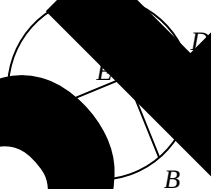
5. Solve for x .



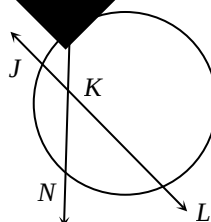
6. Solve for x .



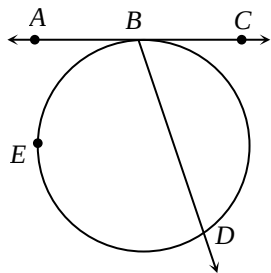
7. If $m\widehat{CB} = (5x - 1)^\circ$, $m\widehat{AD} = (x + 9)^\circ$, and $m\angle AED = 89^\circ$, find $m\widehat{AD}$.



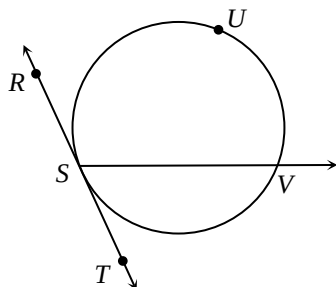
8. If $m\widehat{JM} = (10x + 9)^\circ$, $m\widehat{NL} = (28x + 17)^\circ$, and $m\angle NKL = (16x + 19)^\circ$, find $m\angle NKL$.



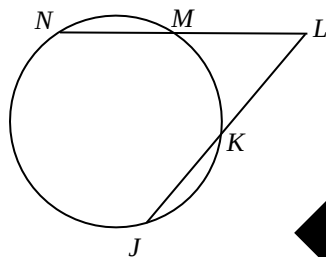
9. If $m\widehat{BED} = (15x - 47)^\circ$ and $m\widehat{BD} = (9x - 1)^\circ$, find $m\angle CBD$.



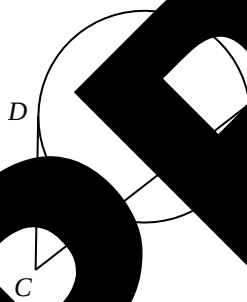
10. If $m\angle TSV = (6x + 17)^\circ$ and $m\widehat{SV} = (15x + 13)^\circ$, find $m\widehat{SUV}$.



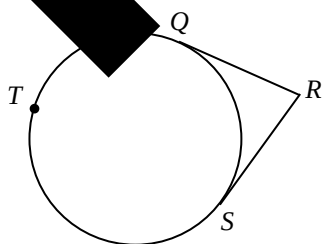
11. If $m\widehat{NJ} = 170^\circ$, $m\widehat{MK} = (5x + 8)^\circ$, and $m\angle MLK = (4x + 3)^\circ$, find $m\angle MLK$.



12. If $m\widehat{DA} = (23x - 14)^\circ$, $m\widehat{AB} = (x - 4)^\circ$, and $m\angle DCB = (5x + 11)^\circ$, find $m\widehat{DA}$.



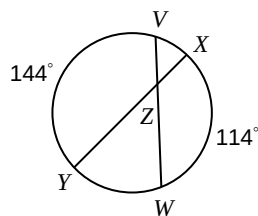
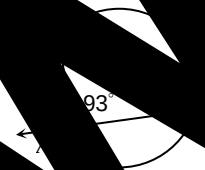
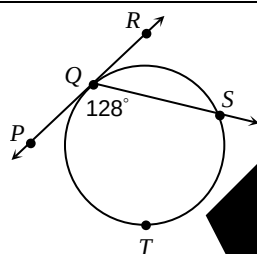
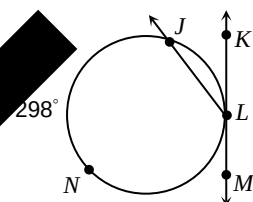
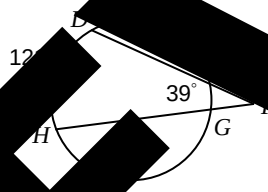
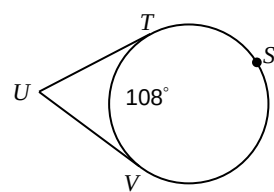
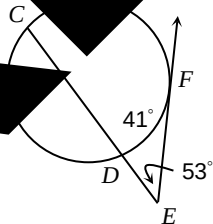
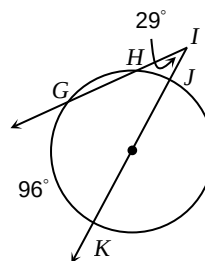
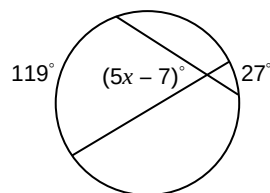
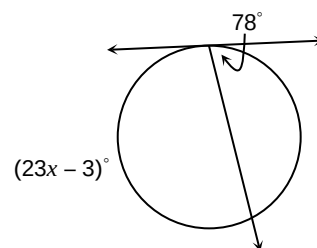
13. If $m\widehat{TS} = (16x + 23)^\circ$, $m\widehat{QS} = (7x + 15)^\circ$, and $m\angle QRS = (5x - 3)^\circ$, find $m\widehat{QTS}$.



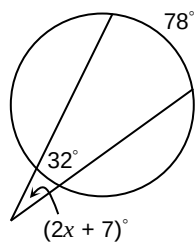
Name: _____

Unit 10: Circles

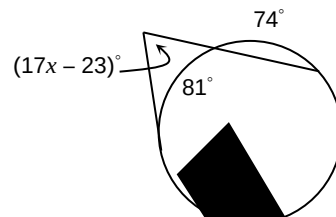
Date: _____ Per: _____

Homework 7: Arc & Angle Measures formed
by Chords, Secants, & Tangents**** This is a 2-page document! ******Directions:** Find each value or measure. Assume that all segments that appear to be tangent are tangent.1. $m\angle YZV$ 2. $m\widehat{AD}$ 3. $m\widehat{QS}$ 4. $m\angle JLK$ 5. $m\angle EFG$ 6. $m\angle TUV$ 7. $m\widehat{CF}$ 8. $m\widehat{HJ}$ 9. Solve for x .10. Solve for x .

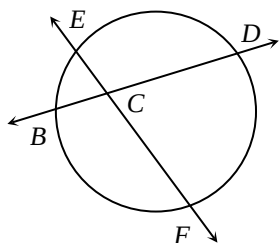
11. Solve for x .



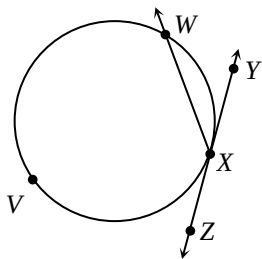
12. Solve for x .



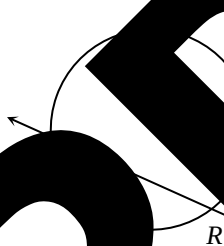
13. If $m\widehat{ED} = (9x - 3)^\circ$, $m\widehat{BF} = (15x - 39)^\circ$, and $m\angle BCF = (11x - 9)^\circ$, find



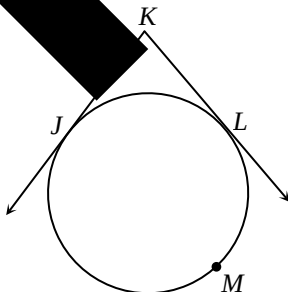
14. If $m\widehat{WVX} = (13x + 9)^\circ$ and $m\angle WXZ = (5x + \quad)^\circ$, find $m\angle$



15. If $m\widehat{QT} = (27x - 9)^\circ$, $m\widehat{RT} = (5x - 5)^\circ$, and $m\angle RST = (10x - 2)^\circ$, find $m\widehat{RT}$.



If $m\widehat{JKL} = (8x - 6)^\circ$ and $m\widehat{JML} = (25x - 13)^\circ$, find $m\widehat{JML}$.



Name:

Date:

Topic:

Class:

Main Ideas/Questions

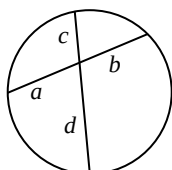
Notes/Examples

SEGMENT LENGTHS

formed by Intersecting
Chords, Secants, & Tangents

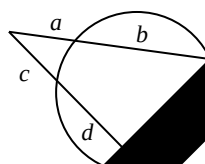
TYPE 1

Intersecting chords
(or secants) inside
the circle.



TYPE 2

Intersecting secants
outside the circle.



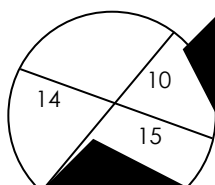
TYPE 3

Intersecting secant
& tangent outside the circle.

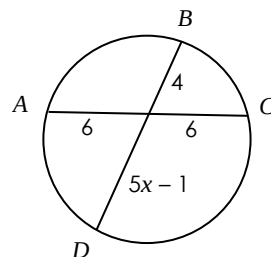


Find each value or measure. Assume all segments that appear to be tangent are tangent.

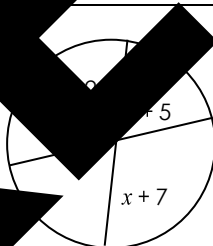
1. Solve for x .



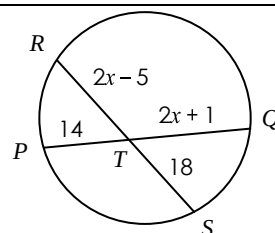
2. Find BC .



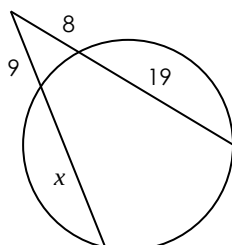
3. Solve for x .



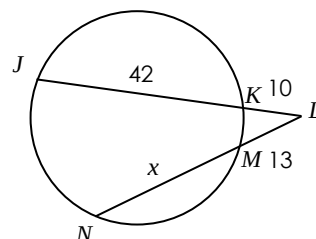
4. Find TQ .



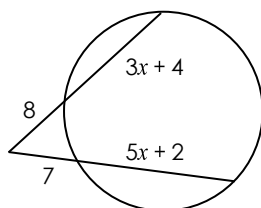
5. Find x .



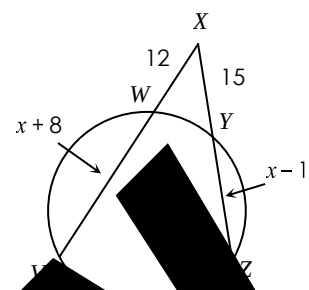
6. Find NL .



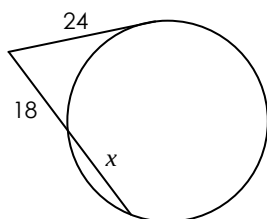
7. Solve for x .



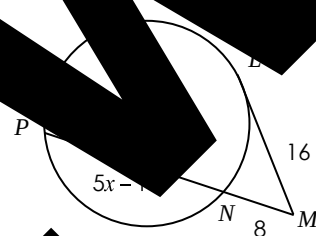
8. Find YZ .



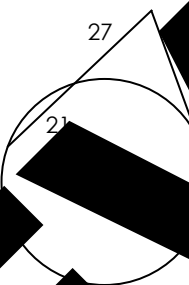
9. Solve for x .



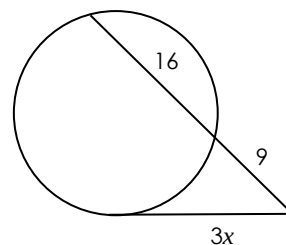
10. Find PN .



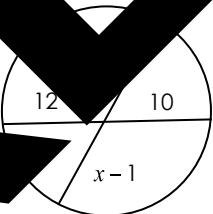
11. Solve for x .



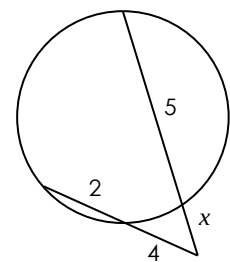
12. Solve for x .



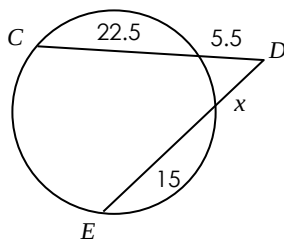
13. Solve for x .



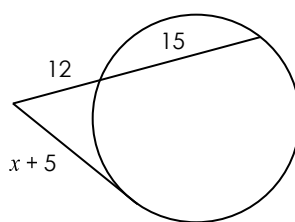
14. Solve for x .



15. Solve for x .



16. Solve for x .



Name: _____

Unit 10: Circles

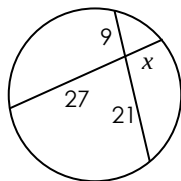
Date: _____ Per: _____

Homework 8: Segment Lengths formed by
Chords, Secants, and Tangents

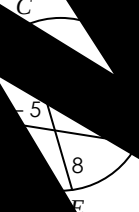
**** This is a 2-page document! ****

Directions: Find each value or measure. Assume all segments that appear to be tangent are tangent.

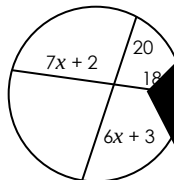
1. Solve for x .



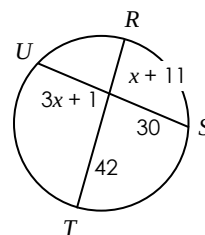
2. Find FD .



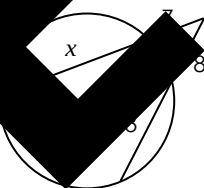
3. Solve for x .



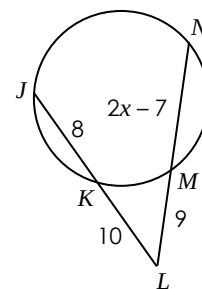
4. Find US .



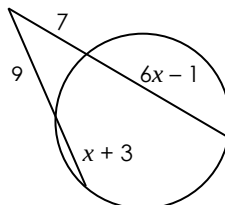
5. Solve for x .



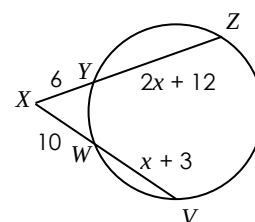
6. Find MN .



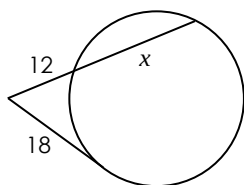
7. Solve for x .



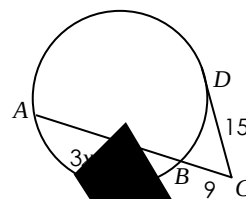
8. Find YZ .



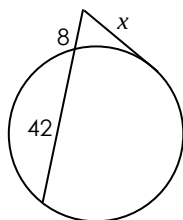
9. Solve for x .



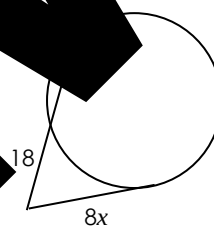
10. Find AC .



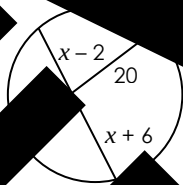
11. Solve for x .



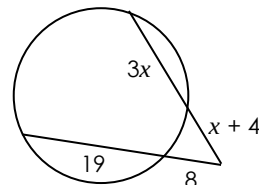
12. Solve for x .



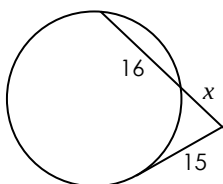
13. Solve for x .



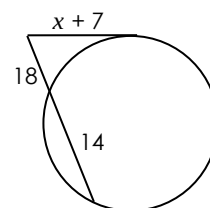
14. Solve for x .



15. Solve for x .



16. Solve for x .



Name: _____

Geometry

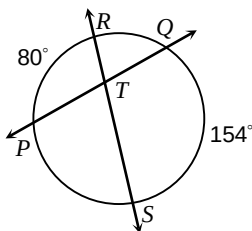
Date: _____ Per: _____

Unit 10: Circles

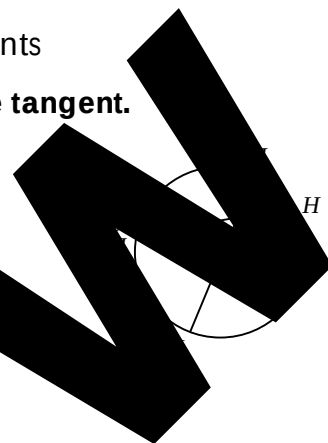
Quiz 10-3: Angles, Arcs, and Segment Lengths
formed by Intersecting Chords, Secants, and Tangents

Find each value or measure. Assume all lines that appear to be tangent are tangent.

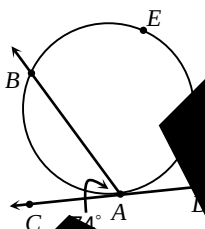
1. $m\angle QTS =$ _____



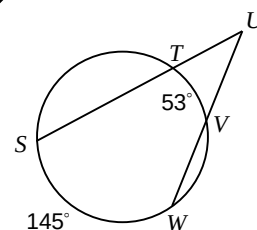
2. $m\widehat{JH} =$ _____



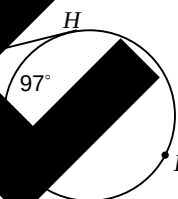
3. $m\widehat{BEA} =$ _____



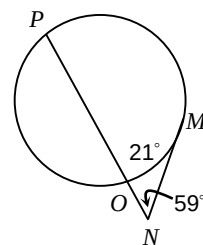
4. $m\angle TUV =$ _____



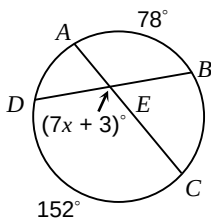
5. $m\angle FGH =$ _____



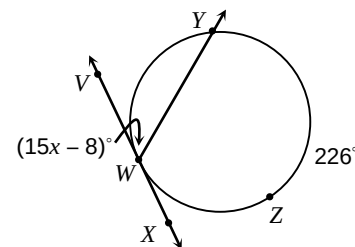
6. $m\widehat{PM} =$ _____



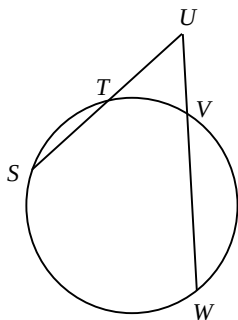
7. $x =$ _____



8. $x =$ _____

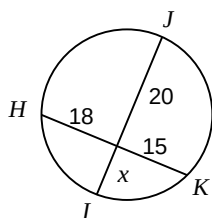


9. If $m\widehat{SW} = (12x - 5)^\circ$, $m\widehat{TV} = (2x + 7)^\circ$, and $m\angle TUV = (6x - 19)^\circ$, find $m\widehat{SW}$.

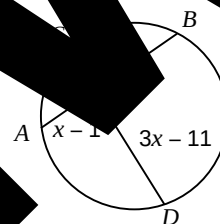


9. $m\widehat{SW} =$ _____

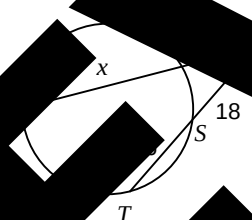
10. $x =$ _____



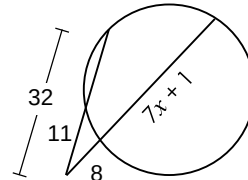
11. $CD =$ _____



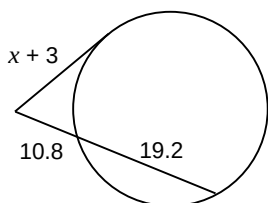
12. $PQ =$ _____



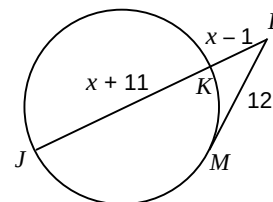
13. $x =$ _____



14. $x =$ _____



15. $JK =$ _____



Name:

Date:

Topic:

Class:

Main Ideas/Questions

Notes/Examples

Standard Form Equation of a circle

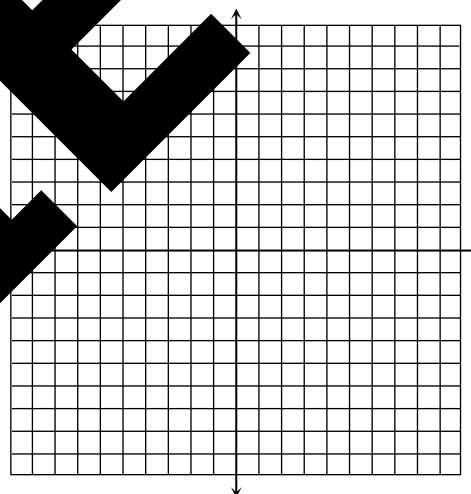
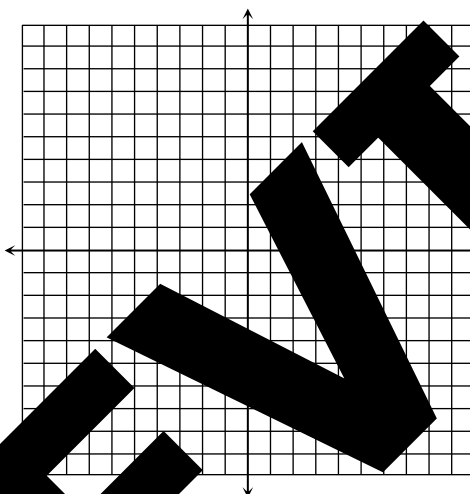
The **standard form** for the equation of a circle in the coordinate plane is given as:

where _____ is the _____ and _____.

Graph each circle and identify its center and radius.

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

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



Center:

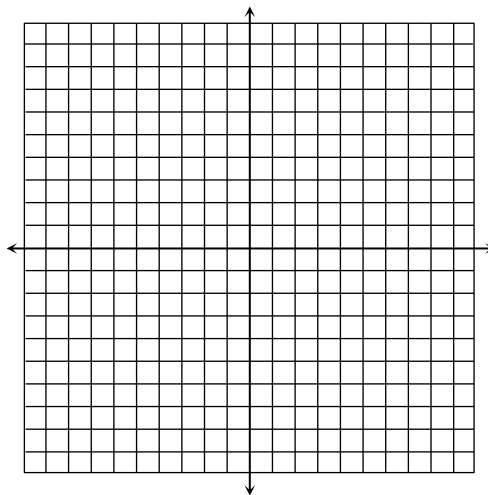
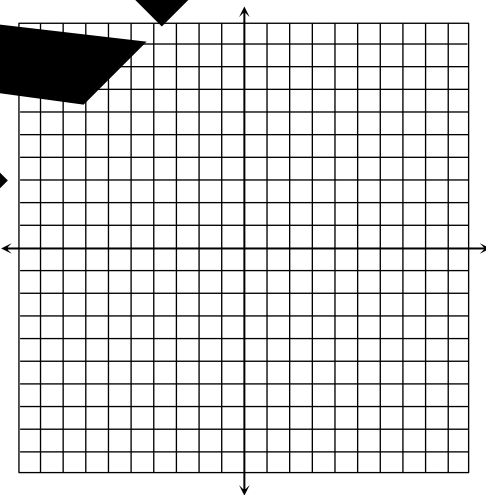
Radius:

Center:

Radius:

3. $(x - 3)^2 + (y - 1)^2 = 49$

4. $(x + 6)^2 + (y + 5)^2 = 16$



Center:

Radius:

Center:

Radius:

Identify each part of the circle given its equation.

5. $(x - 5)^2 + (y - 1)^2 = 64$

Center: _____

Radius: _____

6. $(x + 7)^2 + (y - 2)^2 = 324$

Center: _____

Diameter: _____

7. $x^2 + (y + 10)^2 = 42.25$

Center: _____

Diameter: _____

8. $(x - 6)^2 + (y + 11)^2 = 80$

Center: _____

Radius: _____

9. $(x + 2)^2 + (y + 9)^2 = 196$

Center: _____

Circumference: _____

10. $(x - 3)^2 + (y - 8)^2 = 82$

Center: _____

Circumference: _____

11. $(x - 3)^2 + (y + 4)^2 = 81$

Center: _____

Area: _____

12. $(x + 7)^2 + (y - 1)^2 = 108$

Center: _____

Area: _____

GENERAL Form
Equation
of a circle

The **general form** for the equation of a circle in the coordinate plane is given as:

To convert general form equations to standard form equations using the process called **completing the square**. Converting to standard form is useful when determining the center and radius of the circle.

Converting to
Standard Form

Use the steps below to convert the given equation to standard form. Then identify the radius and center of the circle.

Steps

Given: $x^2 + y^2 - 2x + 6y - 6 = 0$

① Group the x-terms together and the y-terms together. Move the constant to the right side of the equation.

② Take half of the linear x-term and square it. Add this value to both sides of the equation.

③ Take half of the linear y-term and square it. Add this value to both sides of the equation.

④ You have created two perfect square trinomials. Rewrite them in factored form as squared binomials.

⑤ Identify the center and radius of the circle.

EXAMPLES

Write each equation in standard form. Then identify the indicated parts.

13. $x^2 + y^2 + 14x - 4y + 17 = 0$; center and radius

14. $x^2 + y^2 + 4x + 8y - 55 = 0$; center and radius

15. $x^2 + y^2 - 12y - 85 = 0$; center and diameter

16. $x^2 + y^2 - 2x - 2y - 2 = 0$; center and diameter

17. $x^2 + y^2 - 2x + 20 = 2x - 10y$; center and circumference

18. $x^2 + 10x + 16y + 5 = 4x - y^2$; center and area

Name: _____

Unit 10: Circles

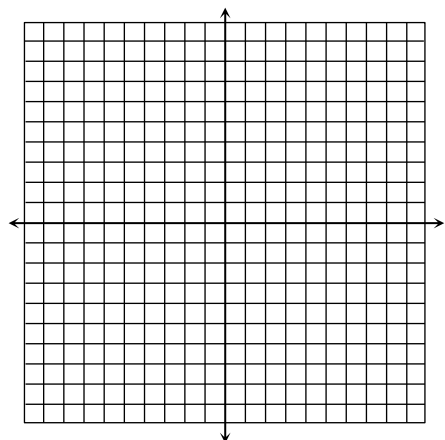
Date: _____ Per: _____

Homework 9: Standard Form of a Circle

** This is a 2-page document! **

Directions: Graph each circle and identify its center and radius.

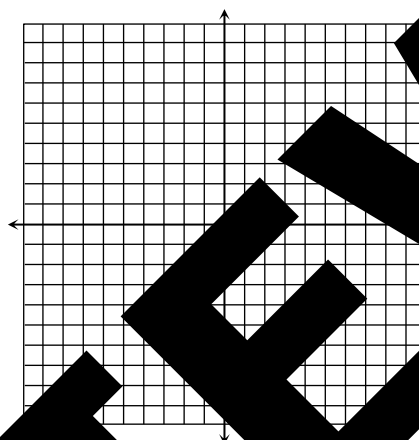
1. $(x - 6)^2 + (y - 1)^2 = 9$



Center:

Radius:

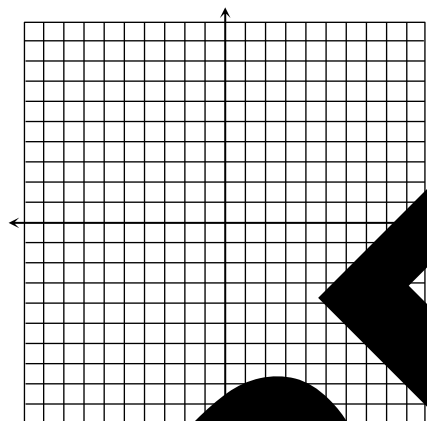
2. $(x - 2)^2 + (y + 3)^2 = 36$



Center:

Radius:

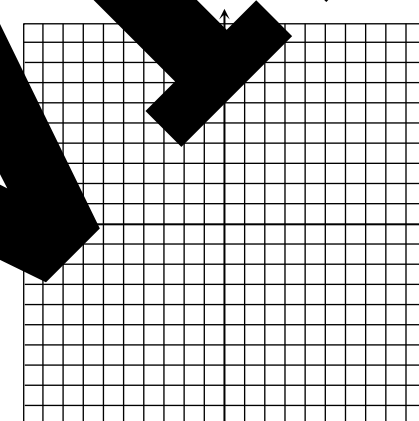
3. $x^2 + (y + 2)^2 = 64$



Center:

Radius:

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



Center:

Radius:

Directions: Identify each part of the circle given its equation.

5. $(x - 9)^2 + (y - 1)^2 = 16$

Center:

Radius:

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

Center:

Diameter:

7. $(x + 4)^2 + (y - 2)^2 = 90.25$

Center:

Diameter:

8. $(x - 2)^2 + (y + 13)^2 = 150$

Center:

Radius:

9. $(x - 1)^2 + (y + 4)^2 = 16$

Center:

Circumference:

10. $(x - 10)^2 + (y - 5)^2 = 28$

Radius:

Circumference:

11. $x^2 + (y + 3)^2 = 81$

Center:

Area:

12. $(x + 5)^2 + (y - 2)^2 = 135$

Diameter:

Area:

Write each equation in standard form. Then identify each part.

13. $x^2 + y^2 + 8x - 6y - 25 = 0$

14. $x^2 + y^2 - 4x - 12y - 129 = 0$

Standard Form:

Standard Form:

Center:

Radius:

Center:

Radius:

15. $x^2 + y^2 + 14x + 10y + 73 = 0$

16. $x^2 + y^2 - 16x - 12y - 10 = 0$

Standard Form:

Standard Form:

Center:

Diameter:

Center:

Diameter:

17. $x^2 + y^2 - 6x + 4y - 3 = 0$

18. $x^2 + y^2 - 9x + 2y = x - 6y + 59$

Standard Form:

Standard Form:

Diameter:

Circumference:

Radius:

Area:

Name:

Date:

Topic:

Class:

Main Ideas/Questions

Notes/Examples

WRITING EQUATIONS of Circles

Recall: The standard form of the equation of a circle:

where _____ is the center and _____ is the radius.

Write each circle equation in standard form with the given information.

Set 1: Given the center and radius/diameter.

1. center: $(5, 3)$, radius: 2

2. center: $(-1, 7)$, radius: 14

3. center: $(-2, -11)$, diameter: 10

4. center: $(9, -9)$, diameter: 32

5. center: $(-3, 5)$, radius: $\sqrt{5}$

6. center: $(15, -6)$, radius: $\sqrt{158}$

Set 2: Given the center and circumference/area.

7. center: $(-4, 4)$, circumference: 6π

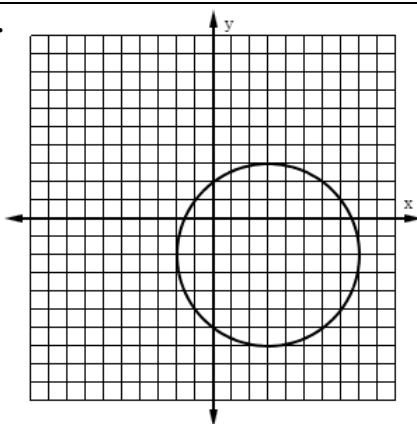
8. center: $(9, 12)$, circumference: 17π

9. center: $(-1, 1)$, area: 16π

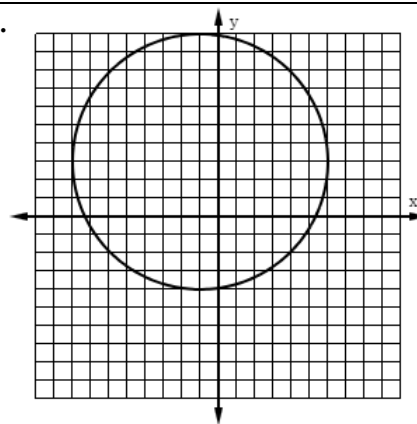
10. center: $(2, -2)$, area: 361π

Set 3: Given a graph.

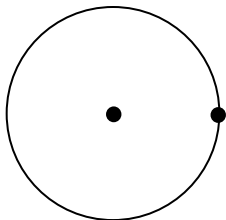
11.



12.



RECALL →



Set 4: Given the center and a point on the circle.

Distance Formula

Midpoint Formula

13. center: (9, 10),
point on circle: (7, 4)

14. center: (1, -5),
point on circle: (-7, -13)

15. center: (2, -6),
point on circle: (1, 10)

16. center: (-2, 0),
point on circle: (-9, -4)

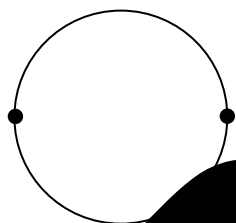
Set 5: Given two endpoints of a diameter.

17. (-5, 1) and (3, -7)

18. (6, -13) and (-2, 15)

19. (6, -16) and (-4, 8)

20. (8, 7) and (-10, -13)



Name: _____

Unit 10: Circles

Date: _____ Per: _____

Homework 10: Equations of Circles

**** This is a 2-page document! ******Directions:** Use the information given to write the equation of the circle in standard form.

1. center: (2, 8), radius: 3

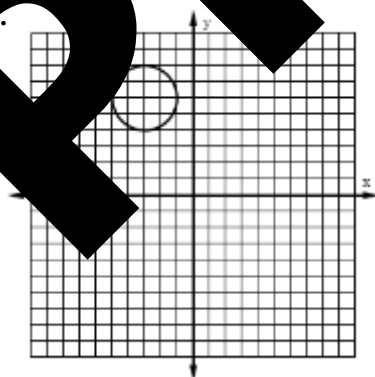
2. center: (5, -13), radius: 11

3. center (-9, -7), diameter: 34

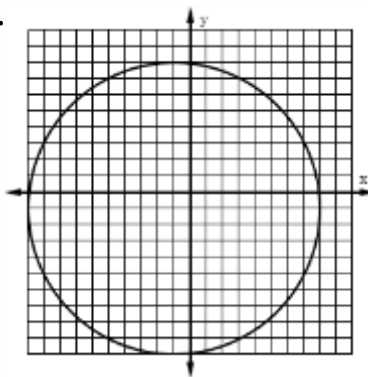
4. center: (-8, 0), diameter: 5

5. center: (0, -16), radius: $\sqrt{15}$ 6. center: (-1, 1), radius: $\sqrt{209}$ 7. center: (10, 7), circumference: 14π 8. center: (0, -1), circumference: 25π 9. center: (-4, -5), area: 400π 10. center: (3, 4), area: π **Use for questions 11-12:** A pizzeria will only deliver to locations within a certain distance of the pizzeria. The delivery region has an area of 36π square miles.11. Assuming the pizzeria is located at the origin, write an equation of the circle in standard form where x and y represent distance from the pizzeria in miles.

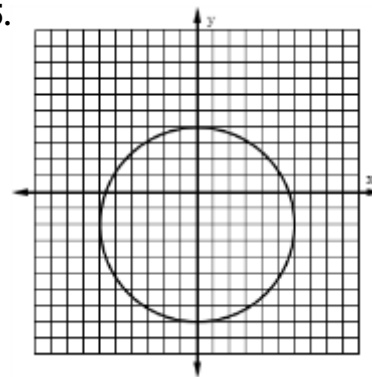
12. Mikayla lives 4 miles north and 6 miles west of the pizzeria. Will the pizzeria deliver to her home?

13. Write the equation for the circle shown on the graph in standard form.

14.



15.



Directions: Use the information given to write the equation of the circle in standard form.

16. center: $(-10, -4)$, point on circle: $(4, -2)$

17. center: $(-9, -3)$, point on circle: $(-11, 2)$

18. center: $(5, -7)$, point on circle: $(-3, -1)$

19. center: $(-1, 4)$, point on circle: $(3, 1)$

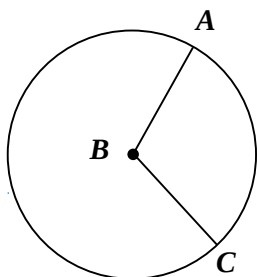
20. endpoints of diameter: $(-10, 1)$ and $(-4, 9)$ endpoints of diameter: $(6, -2)$ and $(10, -10)$

22. endpoints of diameter: $(-8, 12)$ and $(0, 2)$

23. endpoints of diameter: $(8, -1)$ and $(-2, 3)$

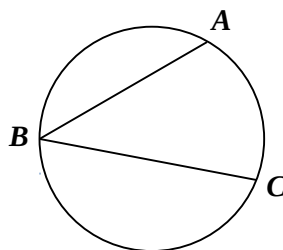
ARC & ANGLE MEASURES IN CIRCLES

Central Angles



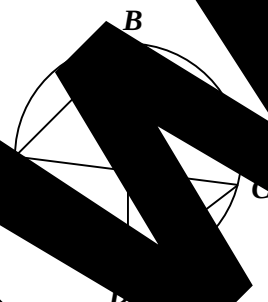
$$m\angle ABC = m\widehat{AC}$$

Inscribed Angles



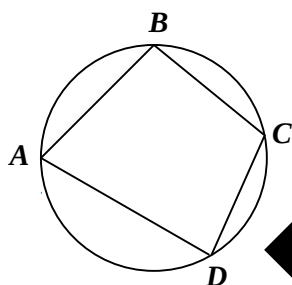
$$m\angle ABC = \frac{1}{2} m\widehat{AC}$$

Overlapping Arcs



$$m\angle ABD = m\angle ACD$$

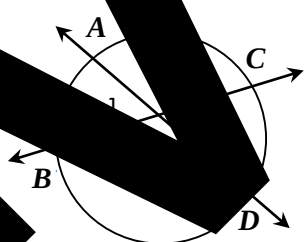
Inscribed Quadrilaterals



$$m\angle A + m\angle C = 180^\circ$$

$$m\angle B + m\angle D = 180^\circ$$

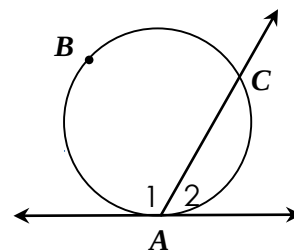
Intersecting Chords or Secants (on the Interior)



$$m\angle 1 = \frac{1}{2} (m\widehat{AB} + m\widehat{CD})$$

$$m\angle 2 = \frac{1}{2} (m\widehat{AC} + m\widehat{BD})$$

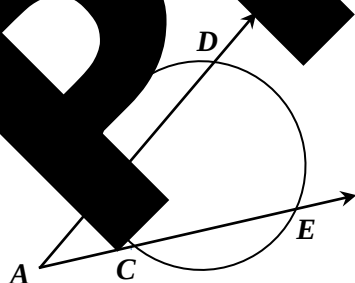
Intersecting Tangents & Chords/Secants (on the circle)



$$m\angle 1 = \frac{1}{2} (m\widehat{ABC})$$

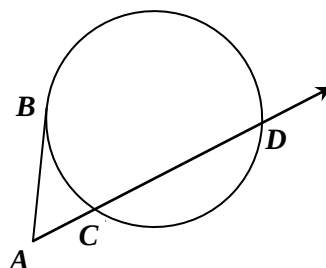
$$m\angle 2 = \frac{1}{2} (m\widehat{AC})$$

Intersecting Secants (on the Exterior)



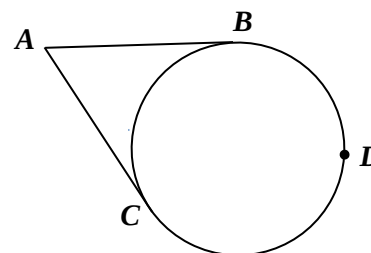
$$m\angle A = \frac{1}{2} (m\widehat{DE} - m\widehat{BC})$$

Intersecting Secants & Tangents (on the Exterior)



$$m\angle A = \frac{1}{2} (m\widehat{BD} - m\widehat{BC})$$

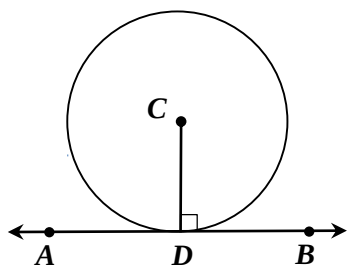
Intersecting Tangents (on the Exterior)



$$m\angle A = \frac{1}{2} (m\widehat{BDC} - m\widehat{BC})$$

SEGMENT LENGTHS IN CIRCLES

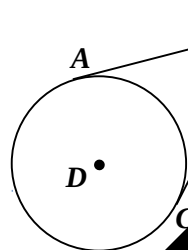
Tangents



If $\overleftrightarrow{AB}$ is tangent to circle C , then

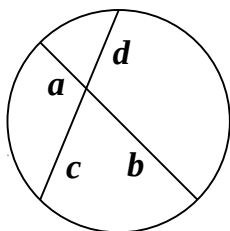
$$\overleftrightarrow{AB} \perp \overline{CD}$$

Two Tangents From the same External Point



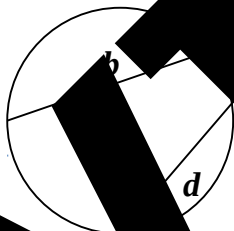
If $\overline{AC}$ and $\overline{BC}$ are tangents to circle D , then $AC = BC$.

Intersecting Chords or Secants (on the Interior)



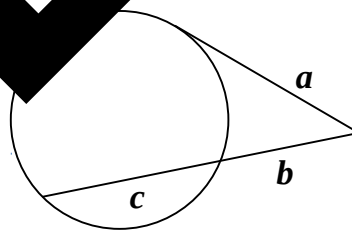
$$a \cdot b = c \cdot d$$

Intersecting Secants (on the Exterior)



$$a(a + b) = c(c + d)$$

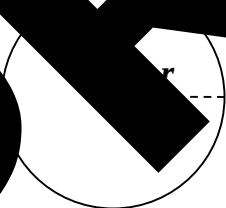
Intersecting Tangent & Secant (on the Exterior)



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

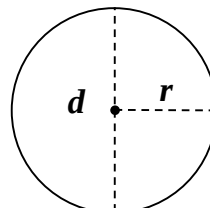
AREA, CIRCUMFERENCE, ARC LENGTH, & CIRCLE EQUATION

Area



$$A = \pi r^2$$

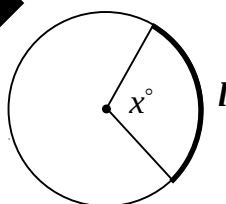
Circumference



$$C = 2\pi r$$

$$C = \pi d$$

Arc Length



$$l = \frac{x \cdot 2\pi r}{360}$$

Standard Equation of a Circle

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

(h, k) is the center and r is the radius

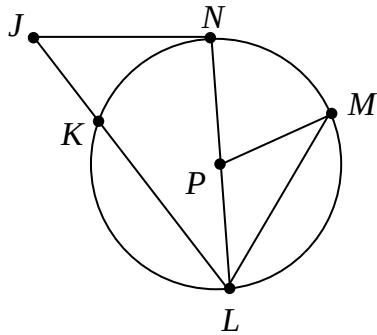
Unit 10 Test Study Guide (Circles)

Name: _____

Date: _____ Per: _____

Topic 1: Parts of Circles

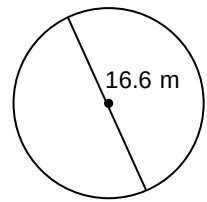
1. Using the diagram below, give an example of each circle part.



- | | |
|--------------------|---------------------------|
| a. Center: _____ | g. Central Angle: _____ |
| b. Radius: _____ | h. Inscribed Angle: _____ |
| c. Diameter: _____ | i. Major Arc: _____ |
| d. Chord: _____ | j. Minor Arc: _____ |
| e. Secant: _____ | k. Semicircle: _____ |
| f. Tangent: _____ | |

Topic 2: Area & Circumference

2. Find the area and circumference of the circle to the right.



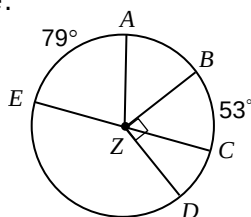
3. Find the radius of a circle with a circumference of 106.8 meters.
4. Find the diameter of a circle with an area of 100.03 square feet.

5. Find the circumference of a circle with an area of 17 square units.

6. Find the area of a circle with a circumference of 30π meters.

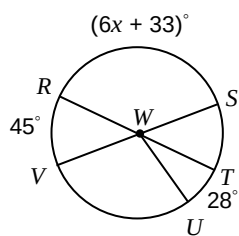
Topic 3: Central Angles

7. Find each arc measure.

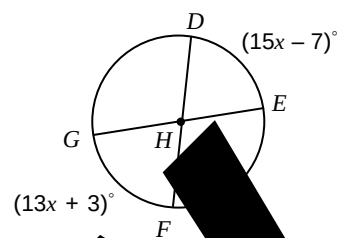


- | | |
|----------------------------|-----------------------------|
| a) $m\widehat{CD}$ = _____ | d) $m\widehat{EB}$ = _____ |
| b) $m\widehat{AB}$ = _____ | e) $m\widehat{BDE}$ = _____ |
| c) $m\widehat{ED}$ = _____ | f) $m\widehat{DEC}$ = _____ |

8. Solve for x .

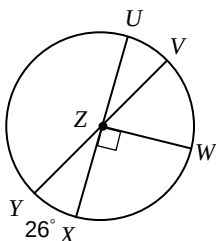


9. Find $m\widehat{EF}$.



Topic 4: Arc Lengths

If the circle below has a radius of 15 cm, find each arc length.

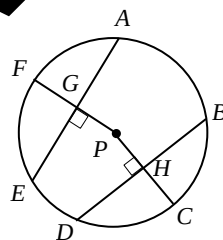
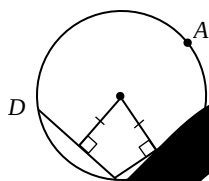


10. $\widehat{VW}$

11. $\widehat{XY}$

Topic 5: Chords & Arcs

12. If $m\widehat{DC} = (12x + 7)^\circ$ and $m\widehat{CB} = (10x - 1)^\circ$, find $m\widehat{DAB}$.



$DB = \underline{\hspace{2cm}}$

$EG = \underline{\hspace{2cm}}$

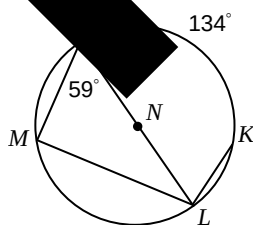
$m\widehat{DB} = \underline{\hspace{2cm}}$

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

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

Topic 6: Inscribed Angles

Find each measure.



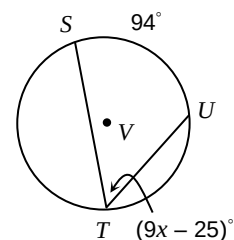
a) $m\widehat{ML} = \underline{\hspace{2cm}}$

b) $m\angle JLK = \underline{\hspace{2cm}}$

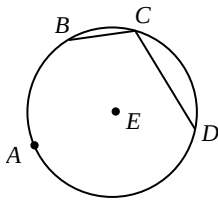
c) $m\angle JLM = \underline{\hspace{2cm}}$

d) $m\widehat{MJ} = \underline{\hspace{2cm}}$

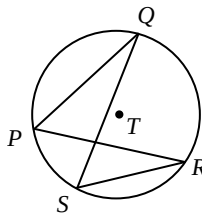
15. Solve for x .



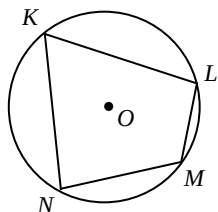
16. If $m\angle BCD = (7x + 10)^\circ$ and $m\widehat{BAD} = (19x - 50)^\circ$, find $m\widehat{BAD}$.



17. If $m\angle PQS = (6x + 1)^\circ$ and $m\angle PRS = (34 - 5x)^\circ$, find $m\widehat{PS}$.



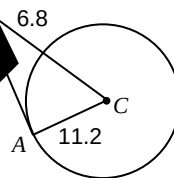
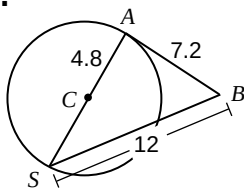
18. If $m\angle K = (8x - 19)^\circ$ and $m\angle M = (5x + 43)^\circ$, find $m\angle M$.



Topic 7: Tangents

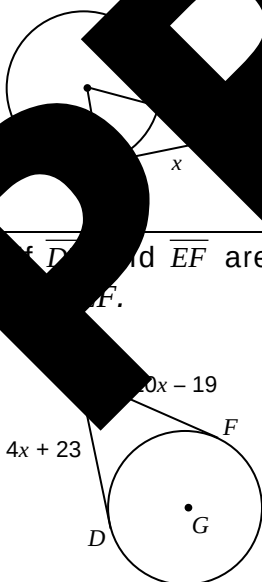
For questions 19-20, determine if $\overline{AB}$ is tangent to circle C.

19.

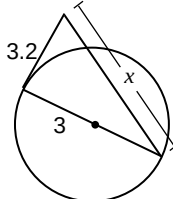


For questions 20-21, determine if $\overline{AB}$ and $\overline{EF}$ are tangent to circle G.

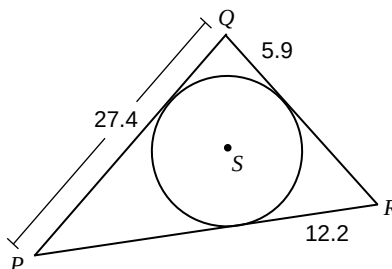
21.



22.



24. Find the perimeter of $\triangle PQR$.



Topic 8: Angles formed by Intersecting Chords, Secants, & Tangents

For questions 25-33, find each measure. Assume segments that appear to be tangent are tangent.

25.

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

26.

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

27.

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

28.

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

29.

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

30.

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

31.

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

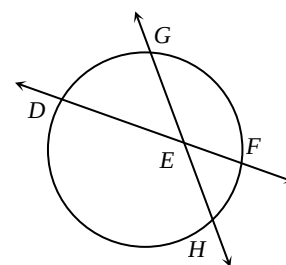
32.

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

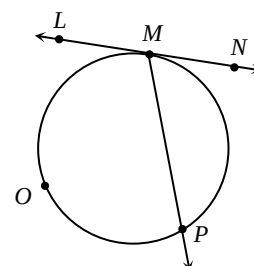
33. Given: $m\angle IFG = 128^\circ$

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

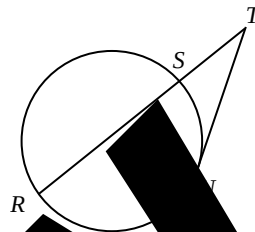
34. If $m\widehat{DH} = (11x + 7)^\circ$, $m\widehat{GF} = (x + 9)^\circ$, and $m\angle GEF = (10x - 22)^\circ$, find $m\widehat{DH}$.



If $m\widehat{OP} = (11x - 38)^\circ$ and $m\angle LMP = (3x + 41)^\circ$, find $m\angle NMP$.



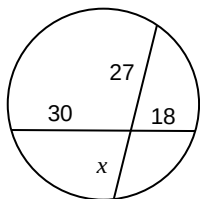
36. If $m\widehat{RU} = (16x - 13)^\circ$, $m\widehat{SU} = (11x - 24)^\circ$, and $m\angle STU = (3x + 1)^\circ$, find $m\widehat{SU}$.



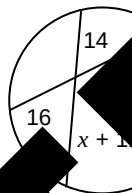
Topic 9: Segment Lengths formed by Intersecting Chords, Secants, & Tangents

For questions 37-40, solve for x . Assume segments that appear to be tangent are tangent.

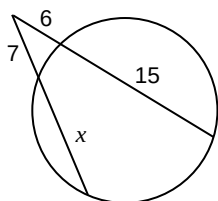
37.



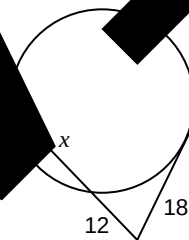
38.



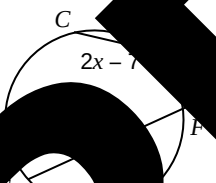
39.



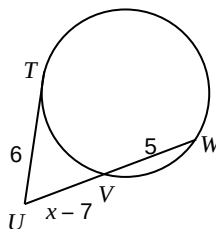
40.



41. Find CD .



42. Find UW .



Topic 10: Equations of Circles

Identify the center and radius/diameter for the following circles.

43. $(x + 2)^2 + (y - 7)^2 = 16$

Center:

Radius:

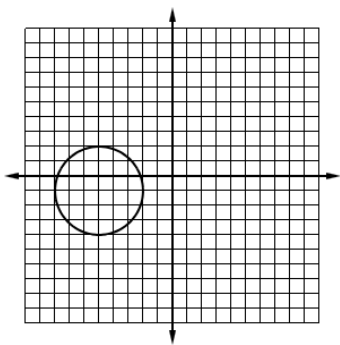
44. $x^2 + (y + 6)^2 = 121$

Center:

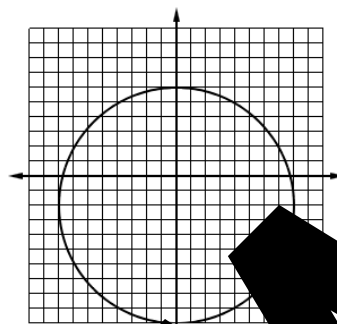
Diameter:

Write the equation of the circle in standard form shown on the graph.

45.



46.



Write an equation of the circle in standard form with the given characteristics.

47. center: $(-3, 4)$, radius: 7

48. center: $(0, 0)$, diameter: 20

49. center: $(-7, -1)$, diameter: 9

50. center: $(12, -5)$, radius: 9

51. center: $(2, -2)$, circumference: 12π

52. center: $(0, 0)$, area: 225π

53. center: $(-4, 7)$, point on circle: $(1, 9)$

54. endpoints of diameter: $(-18, -3)$ and $(8, 11)$

Write the equation in standard form. Then identify the center and radius.

55. $x^2 + y^2 - 6x + 12y + 25 = 0$

56. $x^2 + y^2 + x = 279 + 3x - 6y$

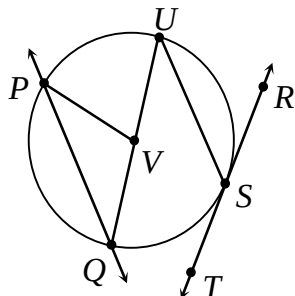
Name: _____

Unit 10 Test

Date: _____ Per: _____

Circles

Use the diagram below for questions 1-3.



1. Which of the following is a tangent?

- A. $\overline{PV}$ B. $\overline{US}$ C. $\overline{RT}$ D. $\overline{PQ}$

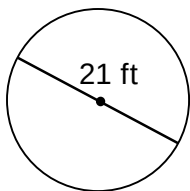
2. Which of the following is a chord?

- A. $\overline{PV}$ B. $\overline{US}$ C. $\overline{RT}$ D. $\overline{PQ}$

3. Which of the following is an inscribed angle?

- A. $\angle PVU$ B. $\angle UST$ C. $\angle QUS$ D. $\angle USR$

Use the circle below for questions 4 and 5.



4. Find the circumference. Round to the nearest hundredth.

$C =$

5. Find the area. Round to the nearest hundredth.

$A =$

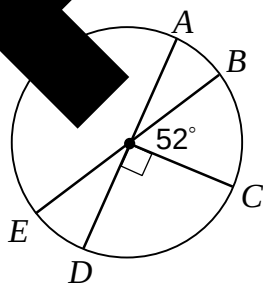
6. Find the diameter of a circle with an area of 226.98 square inches.

$d =$

7. Find the circumference of a circle with an area of 530.93 square meters.

$C =$

Use the circle below for questions 8-10.



8. Find $m\widehat{ED}$.

$m\widehat{ED} =$

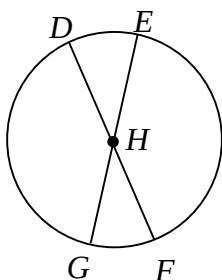
9. Find $m\widehat{EA}$.

$m\widehat{EA} =$

10. Find $m\widehat{BDC}$.

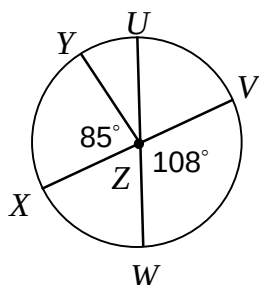
$m\widehat{BDC} =$

11. In circle H , if $m\angle DHG = (11x - 36)^\circ$ and $m\angle GHF = (x + 12)^\circ$, find $m\widehat{DG}$.



$m\widehat{DG} =$

Use the circle below for questions 12 and 13.



$XV = 24$ meters

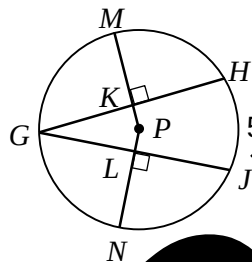
12. Find the length of $\widehat{XW}$. Round to the nearest hundredth.

$\widehat{XW} =$

13. Find the length of $\widehat{YV}$. Round to the nearest hundredth.

$\widehat{YV} =$

Use the circle below for questions 14-15.



$KP = PL$ and $MP = NP$

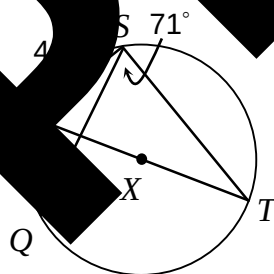
14. Find LJ .

$LJ =$

15. Find $m\widehat{GM}$.

$m\widehat{GM} =$

Use the circle below for questions 16-18.



16. Find $m\widehat{QT}$.

$m\widehat{QT} =$

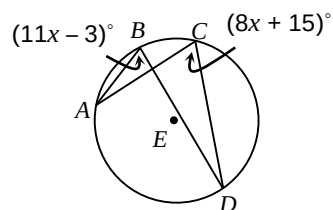
17. Find $m\angle STR$.

$m\angle STR =$

18. Find $m\widehat{ST} - m\widehat{RQ}$.

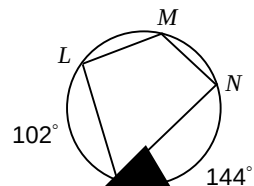
- A. 90°
- B. 92°
- C. 94°
- D. 96°

19. Find $m\widehat{AD}$.



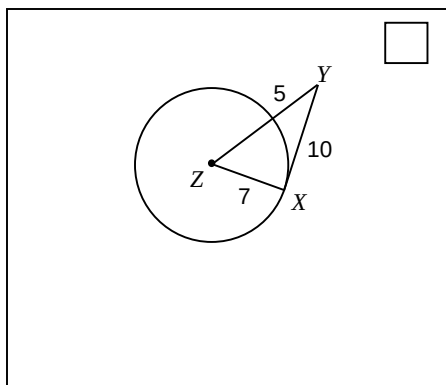
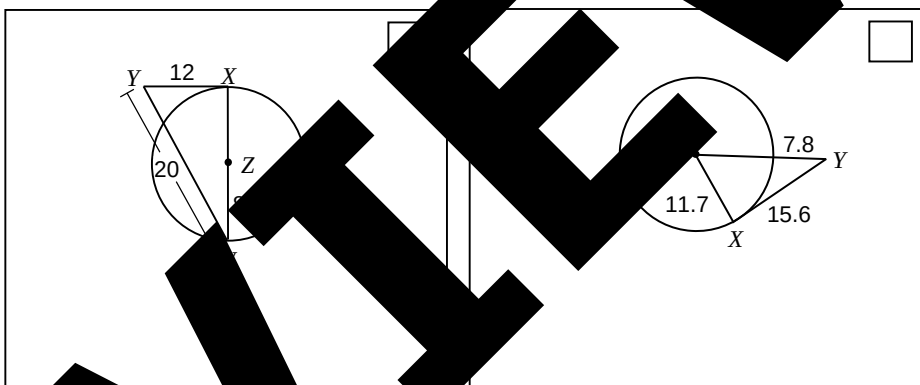
$$m\widehat{AD} =$$

20. Find $m\angle LPN$



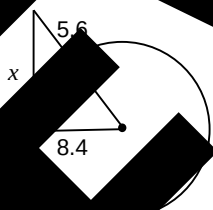
$$m\angle LPN =$$

21. Which diagram(s) show $\overline{XY}$ tangent to circle Z? Check all that apply.


☐

☐
☐

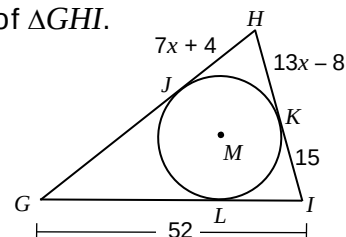
For questions 22-34, assume that all segments that appear to be tangent are tangent.

22. Find the value of x .



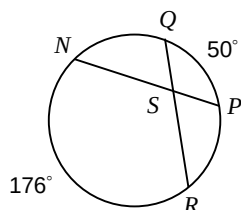
$$x =$$

Find the perimeter of $\triangle GHI$.



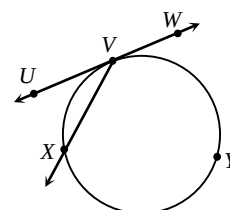
$$P =$$

Find $m\angle R$.



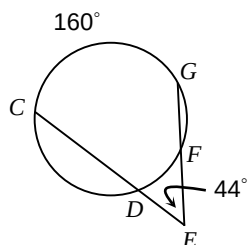
$$m\angle NSR =$$

25. If $m\widehat{VYX} = 282^\circ$ and $m\angle UVX = (4x - 5)^\circ$, find the value of x .



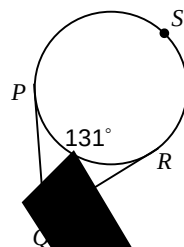
$$x =$$

26. Find $m\widehat{DF}$.



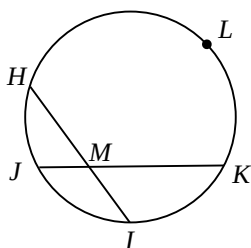
$$m\widehat{DF} =$$

27. Find $m\angle PQR$.



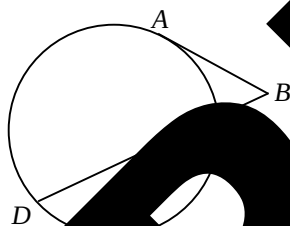
$$m\angle PQR =$$

28. If $m\widehat{JI} = (3x + 2)^\circ$, $m\widehat{HLK} = (15x - 36)^\circ$, and $m\angle HMK = (8x - 1)^\circ$, find $m\widehat{HLK}$.



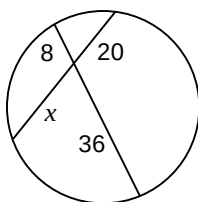
$$m\widehat{HLK} =$$

29. If $m\widehat{AD} = (17x + 2)^\circ$, $m\widehat{AC} = (7x - 16)^\circ$, and $m\angle ABC = (4x + 15)^\circ$, find $m\angle ABC$.



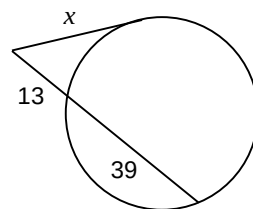
$$m\angle ABC =$$

30. Find the value of x .



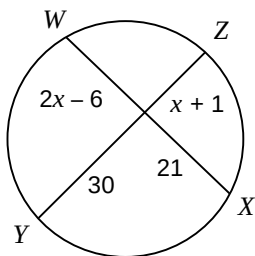
$$x =$$

31. Find the value of x .

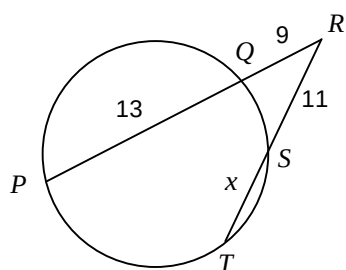


$$x =$$

32. Find YZ .

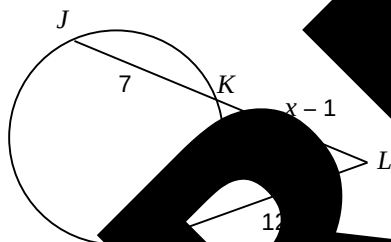


33. Find RT .



$RT =$

34. Find KL .



$KL =$

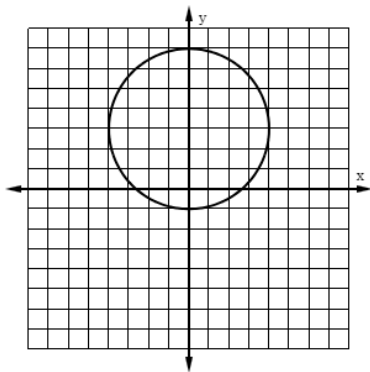
What is the equation of a circle with a center located at $(-7, -1)$ and a radius of 9?

- A. $(x+4)^2 + (y-1)^2 = 9$
- B. $(x+4)^2 + (y-1)^2 = 81$
- C. $(x-4)^2 + (y+1)^2 = 9$
- D. $(x-4)^2 + (y+1)^2 = 81$

36. Which of the following correctly gives the center and radius of the circle defined by the equation $(x-7)^2 + (y-2)^2 = 10$?

- A. center: $(7, 2)$; radius = 100
- B. center: $(7, 2)$; radius = $\sqrt{10}$
- C. center: $(-7, -2)$; radius = 100
- D. center: $(-7, -2)$; radius = $\sqrt{10}$

37. Which equation represents the circle shown on the graph below?



- A. $x^2 + (y - 3)^2 = 4$
- B. $x^2 + (y + 3)^2 = 4$
- C. $x^2 + (y - 3)^2 = 16$
- D. $x^2 + (y + 3)^2 = 16$

38. Which equation represents a circle with a center located at $(-2, 2)$ and a circumference of 16π ?

- A. $(x + 2)^2 + (y - 2)^2 = 64$
- B. $(x - 2)^2 + (y + 2)^2 = 64$
- C. $(x + 2)^2 + (y - 2)^2 = 25$
- D. $(x - 2)^2 + (y + 2)^2 = 25$

39. Write an equation for a circle in standard form with a center at $(-6, 5)$ and passes through the point $(-11, 3)$.

40. Which statement regarding the equation below is true?

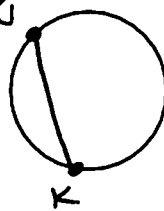
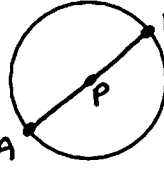
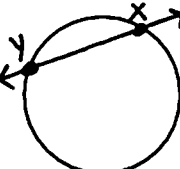
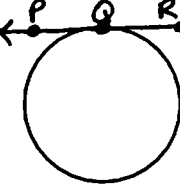
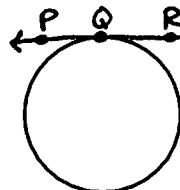
$$x^2 + y^2 - 10x + 14y + 25 = 0$$

- A. It has a diameter of 18 units.
- B. It has an area of 36π square units.
- C. It has a center at $(-5, 3)$.
- D. It has a center at $(-2, -3)$.

BONUS: Find the value of x .

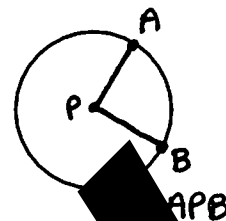


PARTS OF CIRCLES DICTIONARY

Term	Definition	Example or Visual
CIRCLE	The set of points equidistant from a given point (the center).	
RADIUS	A segment with endpoints the center and on the circle.	
CHORD	A segment with endpoints on the circle.	
DIAMETER	A chord that passes through the center. (Length = 2 · radius)	
SECANT	A line that intersects the circle in two places.	
TANGENT	A line that intersects the circle at exactly one place.	
POINT OF TANGENCY	The point at which the tangent line intersects the circle.	

CENTRAL ANGLE

An angle with a vertex at the center, and two sides that are radii.



INSCRIBED ANGLE

An angle with a vertex on the circle, and two sides that are chords.



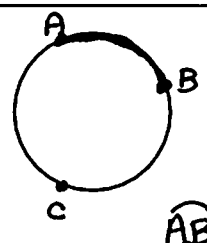
ARC

A portion of the edge of the circle defined by two endpoints.
Symbol: $\frown$



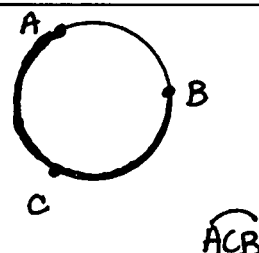
MINOR ARC

An arc with a measure less than 180° .
* Use 2 letters to name it!



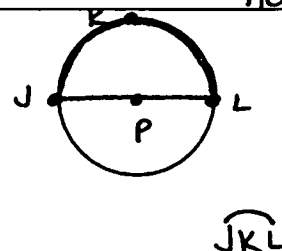
MAJOR ARC

An arc with a measure greater than 180° .
* Use 3 letters to name it!



SEMICIRCLE

An arc with endpoints on the diameter.
Always equal to 180° !



FORMULAS

AREA

$$A = \pi r^2$$

(where r = radius)

CIRCUMFERENCE

$$C = 2\pi r$$

(where r = radius)

$$C = \pi d$$

(where d = diameter)

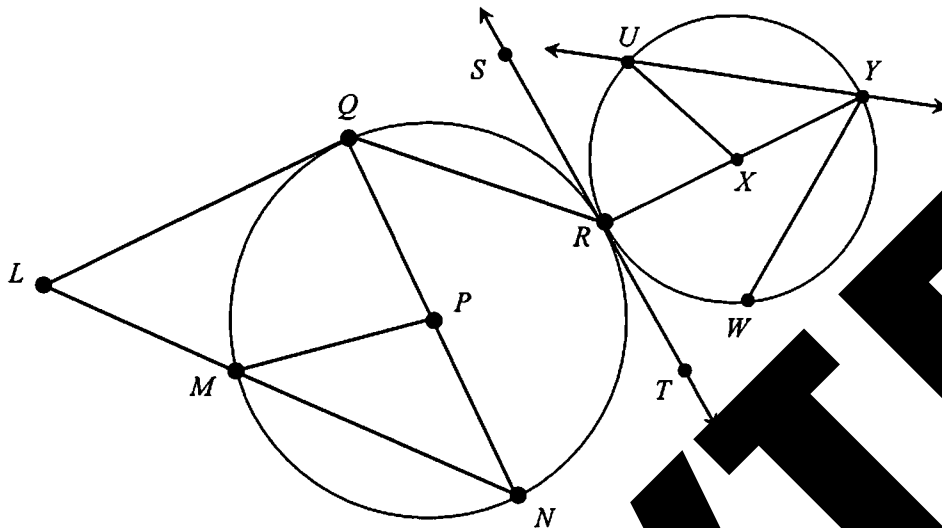
ARC LENGTH

$$l = \frac{x \cdot C}{360}$$

(where C = circumference
and x = degree of arc)

NAME THAT CIRCLE PART!

Directions: Use the diagram below along with the bank to classify each circle part. Parts may be used more than once.



Parts
Center
Radius
Chord
Secant
Tangent
Point of Tangency
Major Arc
Minor Arc
Semicircle
Central Angle
Inscribed Angle

- $\overline{LQ}$ Tangent
- $\overline{WY}$ Chord
- $\angle NQR$ Inscribed Angle
- $\overline{PQ}$ Radius
- $\widehat{RWU}$ Major Arc
- $\overline{ST}$ Tangent
- $\overline{PN}$ Secant
- $\angle UXY$ Central Angle
- $\widehat{MQ}$ Minor Arc
- $\overline{QN}$ Diameter
- $\overline{UY}$ Secant
- $\angle MPQ$ Central Angle
- $\overline{LN}$ Secant
- $\widehat{WY}$ Minor Arc
- $\overline{UX}$ Radius
- $\widehat{RUY}$ Semicircle

Name:

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Main Ideas/Questions

Notes/Examples

AREA & CIRCUMFERENCE

Formulas

AREA FORMULA

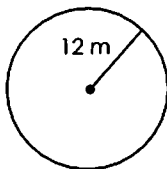
$$A = \pi r^2$$

CIRCUMFERENCE FORMULA

$$C = 2\pi r$$

Directions: Find the area for circles 1-4 and circumference for circles 5-8.

1.



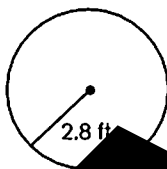
$$\begin{aligned} A &= \pi (12)^2 \\ &= 144\pi \\ &\approx 452.39 \text{ m}^2 \end{aligned}$$

2.



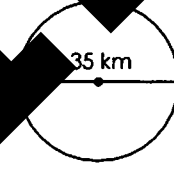
$$\begin{aligned} A &= \pi (18)^2 \\ &= 324\pi \\ &\approx 254.47 \text{ in}^2 \end{aligned}$$

3.



$$\begin{aligned} A &= \pi (2.8)^2 \\ &= 7.84\pi \\ &\approx 24.63 \text{ ft}^2 \end{aligned}$$

4.



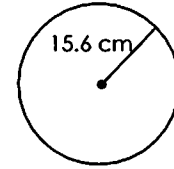
$$\begin{aligned} A &= \pi (17.5)^2 \\ &= 306.25\pi \\ &\approx 962.11 \text{ km}^2 \end{aligned}$$

5.



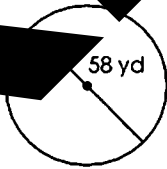
$$\begin{aligned} C &= 2\pi (7) \\ &= 14\pi \\ &\approx 43.98 \text{ m} \end{aligned}$$

6.



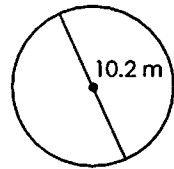
$$\begin{aligned} C &= 2\pi (15.6) \\ &= 31.2\pi \\ &\approx 98.02 \text{ cm} \end{aligned}$$

7.



$$\begin{aligned} C &= 2\pi (29) \\ &= 58\pi \\ &\approx 182.21 \text{ yd} \end{aligned}$$

8.



$$\begin{aligned} C &= 2\pi (5.1) \\ &= 10.2\pi \\ &\approx 32.04 \text{ m} \end{aligned}$$

9. Find the diameter of a circle with a circumference of 65.97 meters.

$$\begin{aligned} C &= \pi d \\ \frac{65.97}{\pi} &= \frac{\pi d}{\pi} \\ d &= 21 \text{ m} \end{aligned}$$

10. Find the radius of a circle with a circumference of 21.99 feet.

$$\begin{aligned} C &= 2\pi r \\ \frac{21.99}{2\pi} &= \frac{2\pi r}{2\pi} \\ r &= 3.5 \text{ ft} \end{aligned}$$

Find a
RADIUS OR
DIAMETER

**WORKING
BETWEEN
FORMULAS**

11. Find the radius of a circle with a circumference of 35π yards.

$$C = 2\pi r$$

$$\frac{35\pi}{2\pi} = \frac{2\pi r}{2\pi}$$

$$r = 17.5 \text{ yd}$$

12. Find the radius of a circle with an area of 380.13 square inches.

$$A = \pi r^2$$

$$\frac{380.13}{\pi} = \frac{\pi r^2}{\pi}$$

$$121 = r^2$$

$$r = 11$$

13. Find the diameter of a circle with an area of 615.75 cm².

$$A = \pi r^2$$

$$\frac{615.75}{\pi} = \frac{\pi r^2}{\pi}$$

$$196 = r^2$$

$$r = 14 \rightarrow d = 28 \text{ cm}$$

14. Find the diameter of a circle with an area of 90.25 m².

$$A = \pi r^2$$

$$\frac{90.25}{\pi} = \frac{\pi r^2}{\pi}$$

$$28.75 = r^2$$

$$r = 5.37 \rightarrow d = 10.74 \text{ m}$$

15. Find the area of a circle with a circumference of 26\pi feet.

$$C = 2\pi r$$

$$\frac{26\pi}{2\pi} = \frac{2\pi r}{2\pi}$$

$$13 = r$$

$$A = \pi r^2$$

$$A = \pi (13)^2$$

$$A = 169\pi$$

$$A \approx 530.93 \text{ ft}^2$$

16. Find the circumference of a circle with an area of 289\pi mm².

$$A = \pi r^2$$

$$\frac{289\pi}{\pi} = \frac{\pi r^2}{\pi}$$

$$289 = r^2$$

$$r = 17$$

$$C = 2\pi r$$

$$C = 2\pi (17)$$

$$C = 34\pi$$

$$C \approx 106.81 \text{ mm}$$

17. Find the circumference of a circle with an area of 113.1 in².

$$A = \pi r^2$$

$$\frac{113.1}{\pi} = \frac{\pi r^2}{\pi}$$

$$36 = r^2$$

$$r = 6$$

$$C = 2\pi r$$

$$C = 2\pi (6)$$

$$C = 12\pi$$

$$C \approx 37.7 \text{ in}$$

18. Find the area of a circle with a circumference of 131.95 meters.

$$C = 2\pi r$$

$$\frac{131.95}{2\pi} = \frac{2\pi r}{2\pi}$$

$$r = 21$$

$$A = \pi r^2$$

$$A = \pi (21)^2$$

$$A = 441\pi$$

$$A \approx 1385.44 \text{ m}^2$$

19. Find the area of a circle with a circumference of 18.84 yards.

$$C = 2\pi r$$

$$\frac{18.84}{2\pi} = \frac{2\pi r}{2\pi}$$

$$r = 3$$

$$A = \pi r^2$$

$$A = \pi (3)^2$$

$$A = 9\pi$$

$$A \approx 28.27 \text{ yd}^2$$

20. Find the circumference of a circle with an area of 1,809.56 square centimeters.

$$A = \pi r^2$$

$$\frac{1809.56}{\pi} = \frac{\pi r^2}{\pi}$$

$$576 = r^2$$

$$r = 24$$

$$C = 2\pi r$$

$$C = 2\pi (24)$$

$$C = 48\pi$$

$$C \approx 150.8 \text{ cm}$$

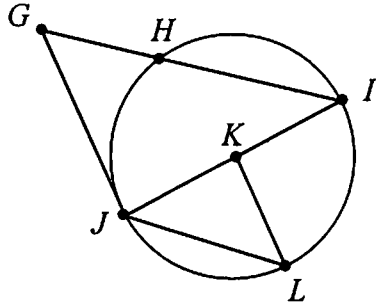
Name: _____

Unit 10: Circles

Date: _____ Per: _____

Homework 1: Parts of Circles;
Area & Circumference**** This is a 2-page document! ****

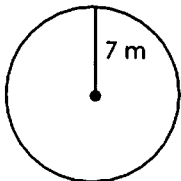
1. Give an example of each circle part using the diagram below.

a) Center: Kb) Radius: $\overline{KL}$ c) Chord: $\overline{JI}$ d) Diameter: $\overline{JI}$ e) Secant: $\overline{GI}$ f) Tangent: $\overline{GJ}$ g) Point of Tangency: Jh) Minor Arc: $\widehat{HI}$ i) Major Arc: $\widehat{HJLI}$ j) Sector: $\triangle KJI$ k) Central Angle: $\angle K$ l) Inscribed Angle: $\angle GJL$

* Several possible answers

Directions: Find the area and circumference of each circle below.

2.



$$A = \pi (7)^2$$

$$= 49\pi$$

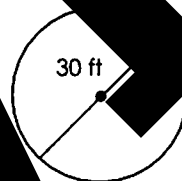
$$\approx 153.94 \text{ m}^2$$

$$C = 2\pi(7)$$

$$= 14\pi$$

$$\approx 43.98 \text{ m}$$

3.



$$A = \pi (30)^2$$

$$= 900\pi$$

$$\approx 2827.43 \text{ ft}^2$$

$$C = 2\pi(30)$$

$$= 60\pi$$

$$\approx 188.5 \text{ ft}$$

4.



$$A = \pi (10.2)^2$$

$$= 104.04\pi$$

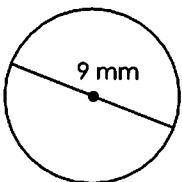
$$\approx 327.85 \text{ in}^2$$

$$C = 2\pi(10.2)$$

$$= 20.4\pi$$

$$\approx 64.09 \text{ in}$$

5.



$$A = \pi (4.5)^2$$

$$= 20.25\pi$$

$$\approx 63.62 \text{ mm}^2$$

$$C = 2\pi(4.5)$$

$$= 9\pi$$

$$\approx 28.27 \text{ mm}$$

Radius of Circle A is three feet less than twice the diameter of Circle B. If the sum of the perimeters of both circles is 49 feet, find the area and circumference of Circle A.

$$\text{Circle A: } r = 2x - 3 \rightarrow d = 4x - 6$$

$$\text{Circle B: } d = x$$

$$4x - 6 + x = 49$$

$$5x - 6 = 49$$

$$5x = 55$$

$$x = 11$$

$$\text{Circle A: } r = 2(11) - 3$$

$$r = 19 \text{ ft}$$

$$A = \pi (19)^2$$

$$= 361\pi$$

$$\approx 1134.11 \text{ ft}^2$$

$$C = 2\pi(19)$$

$$= 38\pi$$

$$\approx 119.38 \text{ ft}$$

Directions: Use the area and circumference formulas to find the radius or diameter.

7. Find the radius of a circle with an area of 615.75 square kilometers.

$$\frac{615.75}{\pi} = \frac{\pi r^2}{\pi}$$

$$r^2 = 196$$

$$r = 14 \text{ km}$$

8. Find the diameter of a circle with a circumference of 15.71 yards.

$$\frac{15.71}{2\pi} = \frac{2\pi r}{2\pi}$$

$$r = 2.5 \rightarrow d = 5 \text{ yd}$$

9. Find the diameter of a circle with an area of 415.48 square inches.

$$\frac{415.48}{\pi} = \frac{\pi r^2}{\pi}$$

$$r^2 = 132.25$$

$$r = 11.5 \rightarrow d = 23 \text{ in}$$

10. Find the radius of a circle with a circumference of 125.12 feet.

$$\frac{125.12}{2\pi} = \frac{2\pi r}{2\pi}$$

$$r = 10 \text{ ft}$$

11. Find the diameter of a circle with an area of 240.25π square millimeters.

$$\frac{240.25\pi}{\pi} = \frac{\pi r^2}{\pi}$$

$$240.25 = r^2$$

$$r = 15.5 \rightarrow d = 31 \text{ mm}$$

12. Find the radius of a circle with a circumference of 45π centimeters.

$$\frac{45\pi}{2\pi} = \frac{2\pi r}{2\pi}$$

$$r = 22.5 \text{ cm}$$

Directions: Use the information given to find the area or circumference.

13. Find the area of a circle with a circumference of 11π feet.

$$\frac{11\pi}{2\pi} = r \quad A = \pi (5.5)^2$$

$$5.5 = r \quad 30.25\pi$$

$$\approx 95.03 \text{ ft}^2$$

14. Find the circumference of a circle with an area of 676π square millimeters.

$$\frac{676\pi}{\pi} = \frac{\pi r^2}{\pi}$$

$$676 = r^2$$

$$r = 26$$

$$C = 2\pi 26$$

$$= 52\pi$$

$$\approx 163.36 \text{ mm}$$

15. Find the circumference of a circle with an area of 1,134.11 square meters.

$$\frac{1134.11}{\pi} = \frac{\pi r^2}{\pi}$$

$$361 = r^2$$

$$19 = r$$

$$C = 2\pi 19$$

$$= 38\pi$$

$$\approx 119.38 \text{ m}$$

16. Find the area of a circle with a circumference of 53.41 inches.

$$\frac{53.41}{2\pi} = \frac{2\pi r}{2\pi}$$

$$r = 8.5$$

$$A = \pi (8.5)^2$$

$$= 72.25\pi$$

$$\approx 226.98 \text{ in}^2$$

Name:

Date:

Topic:

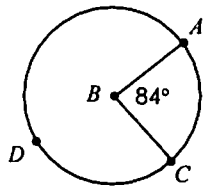
Class:

Main Ideas/Questions

Notes/Examples

CENTRAL ANGLES

& Arc Measures



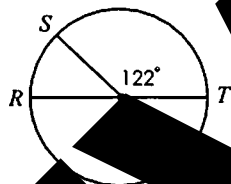
- A **central angle** is an angle with its vertex at the center of a circle and its two sides are radii.
- For example: $\angle ABC$ is a central angle in circle $\odot B$ to points A and C .
- The sum of all central angles in a circle is 360° .
- The **measure of the arc** formed by the endpoints of a central angle is equal to the degree of the central angle.

$$m\widehat{AC} = 84^\circ; m\widehat{ADC} = 276^\circ$$

EXAMPLES

Directions: Find each arc or arc measure.

1.



$$m\widehat{ST} = 122^\circ$$

$$m\widehat{RS} = 58^\circ$$

$$m\widehat{SRT} = 238^\circ$$



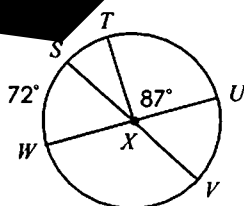
$$m\widehat{JK} = 21^\circ$$

$$m\angle JNM = 159^\circ$$

$$m\widehat{KL} = 159^\circ$$

$$m\widehat{JKM} = 201^\circ$$

$$m\widehat{MKL} = 339^\circ$$



$$m\angle UXV = 12^\circ$$

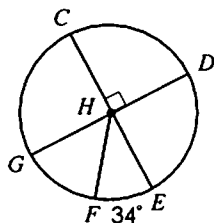
$$m\widehat{ST} = 21^\circ$$

$$m\widehat{WV} = 108^\circ$$

$$m\widehat{TW} = 93^\circ$$

$$m\widehat{TVW} = 267^\circ$$

4.



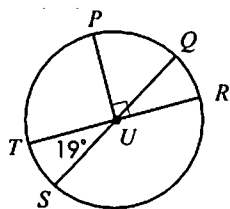
$$m\widehat{CD} = 90^\circ$$

$$m\widehat{FD} = 124^\circ$$

$$m\widehat{DCF} = 236^\circ$$

$$m\widehat{GDF} = 304^\circ$$

5.



$$m\widehat{PQ} = 71^\circ$$

$$m\widehat{SR} = 161^\circ$$

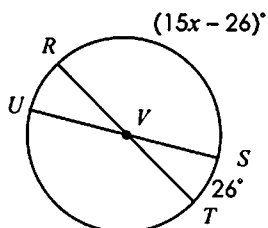
$$m\widehat{QRT} = 199^\circ$$

$$m\widehat{PSR} = 20^\circ$$

$$m\widehat{S} = 1^\circ$$

Directions: Find each value or measure.

6.



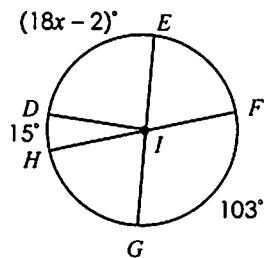
$$15x - 26 = 154$$

$$15x = 180$$

$$x = 12$$

$$x = 12$$

7.



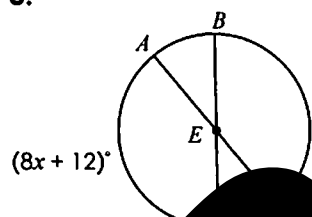
$$18x - 2 = 90$$

$$18x = 92$$

$$x = 5$$

$$x = 5$$

8.



$$10x - 22 = 12$$

$$2x - 22 = 12$$

$$2x = 34$$

$$x = 17$$

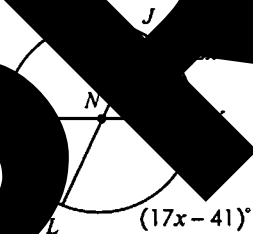
$$x = 17$$

$$m\widehat{AD} = 148^\circ$$

$$m\widehat{CD} = 32^\circ$$

$$m\widehat{BDC} = 212^\circ$$

9.



$$5x + 23 + 17x - 41 = 180$$

$$22x - 18 = 180$$

$$22x = 198$$

$$x = 9$$

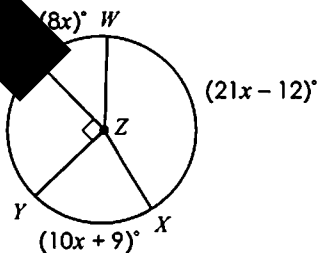
$$x = 9$$

$$m\widehat{JK} = 68^\circ$$

$$m\widehat{MJ} = 112^\circ$$

$$m\widehat{LMK} = 248^\circ$$

10.



$$8x + 21x - 12 + 10x + 9 = 270$$

$$39x - 3 = 270$$

$$39x = 273$$

$$x = 7$$

$$x = 7$$

$$m\widehat{WX} = 135^\circ$$

$$m\widehat{YW} = 146^\circ$$

$$m\widehat{YX} = 79^\circ$$

$$m\widehat{VXW} = 304^\circ$$

Name: _____

Unit 10: Circles

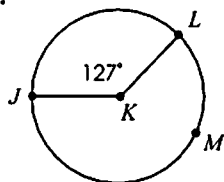
Date: _____ Per: _____

Homework 2: Central Angles & Arc Measures

** This is a 2-page document! **

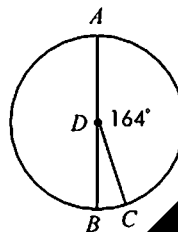
Directions: Find the following arc measures.

1.



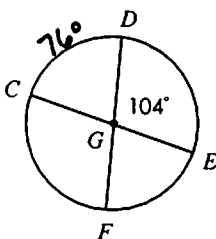
$$\begin{aligned} m\widehat{JL} &= 127^\circ \\ m\widehat{JML} &= 233^\circ \end{aligned}$$

2.



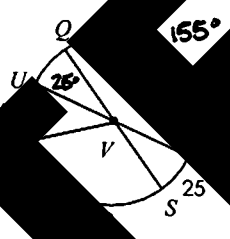
$$\begin{aligned} m\widehat{AB} &= 164^\circ \\ m\widehat{ABC} &= 196^\circ \end{aligned}$$

3.



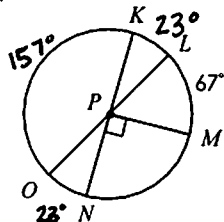
$$\begin{aligned} m\widehat{DE} &= 104^\circ \\ m\widehat{FE} &= 76^\circ \\ m\widehat{DEF} &= 180^\circ \\ m\widehat{CFD} &= 284^\circ \\ m\widehat{DFE} &= 256^\circ \end{aligned}$$

4.



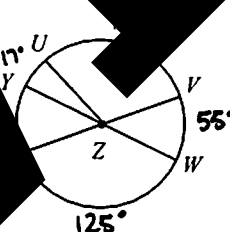
$$\begin{aligned} m\widehat{TQ} &= 69^\circ \\ m\widehat{QR} &= 155^\circ \\ m\widehat{TS} &= 111^\circ \\ m\widehat{SQR} &= 335^\circ \\ m\widehat{RQT} &= 224^\circ \end{aligned}$$

5.



$$\begin{aligned} m\widehat{KL} &= 23^\circ \\ m\widehat{LM} &= 203^\circ \\ m\widehat{OM} &= 157^\circ \\ m\widehat{KNL} &= 35^\circ \\ m\widehat{MNO} &= 157^\circ \end{aligned}$$

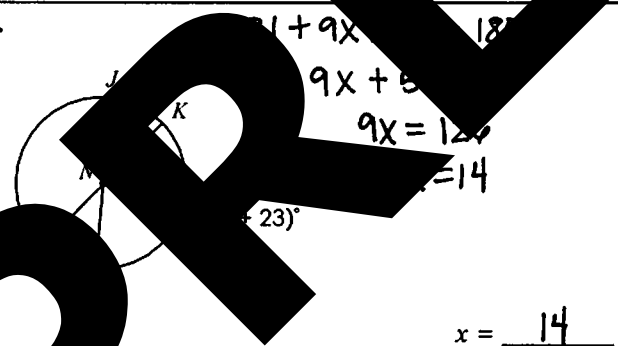
6.



$$\begin{aligned} m\widehat{YU} &= 17^\circ \\ m\widehat{XW} &= 125^\circ \\ m\widehat{XVW} &= 235^\circ \\ m\widehat{VW} &= 55^\circ \\ m\widehat{YWU} &= 343^\circ \end{aligned}$$

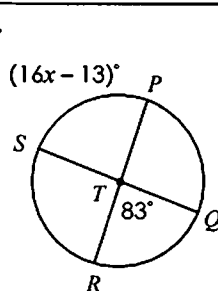
Directions: Find the value of x.

7.



$$x = 14$$

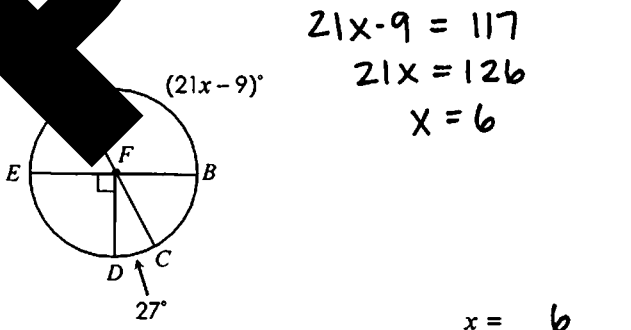
8.



$$\begin{aligned} 16x - 13 &= 83 \\ 16x &= 96 \\ x &= 6 \end{aligned}$$

$$x = 6$$

9.

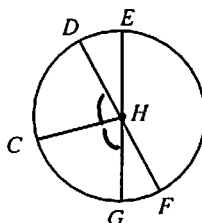


$$\begin{aligned} 21x - 9 &= 117 \\ 21x &= 126 \\ x &= 6 \end{aligned}$$

$$x = 6$$

10.

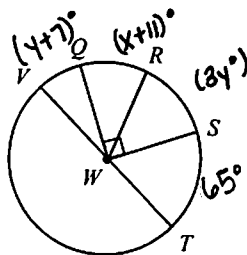
Given: $\overline{CH}$ bisects $\angle DHG$,
 $m\widehat{GF} = (2x + 6)^\circ$, and $m\widehat{DC} = (7x - 1)^\circ$.



$$\begin{aligned} 2x + 6 + 2(7x - 1) &= 180 \\ 2x + 6 + 14x - 2 &= 180 \\ 16x + 4 &= 180 \\ 16x &= 176 \\ x &= 11 \end{aligned}$$

$$x = 11$$

11. If $m\widehat{VQ} = (y + 7)^\circ$, $m\widehat{QR} = (x + 11)^\circ$, $m\widehat{RS} = (3y)^\circ$, and $m\widehat{ST} = 65^\circ$, find the values of x and y .

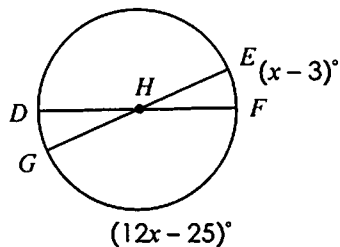


$$\begin{aligned} y + 7 + 65 &= 90 \\ y + 72 &= 90 \\ y &= 18 \end{aligned}$$

$$\begin{aligned} x + 11 + 3(18) &= 90 \\ x + 11 + 54 &= 90 \\ x + 65 &= 90 \\ x &= 25 \end{aligned}$$

Directions: Find the value of x and each arc measure.

12.



$$12x - 25 + x - 3 = 180$$

$$13x - 28 = 180$$

$$13x = 208$$

$$x = 16$$

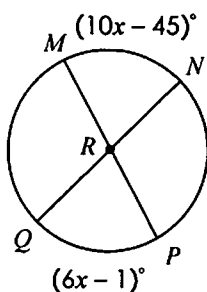
$$x = 16$$

$$m\widehat{DE} = 167^\circ$$

$$m\widehat{EF} = 13^\circ$$

$$m\widehat{DFG} = 347^\circ$$

13.



$$10x - 45 + 6x - 1 = 180$$

$$16x - 46 = 180$$

$$16x = 226$$

$$x = 11$$

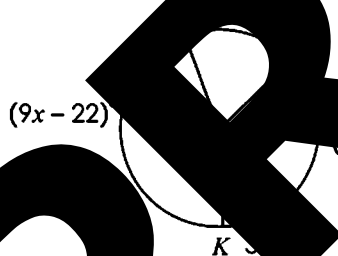
$$x = 11$$

$$m\widehat{MN} = 65^\circ$$

$$m\widehat{NP} = 115^\circ$$

$$m\widehat{NQP} = 245^\circ$$

14.



$$9x - 22 + 34 + 5x - 7 + 34 = 360$$

$$14x + 66 = 360$$

$$14x = 294$$

$$x = 21$$

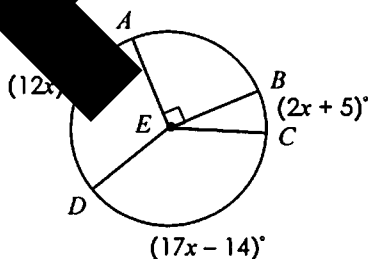
$$x = 21$$

$$m\widehat{GK} = 167^\circ$$

$$m\widehat{HJ} = 98^\circ$$

$$m\widehat{HGJ} = 262^\circ$$

$$m\widehat{GKJ} = 201^\circ$$



$$12x + 17x - 14 + 2x + 5 = 270$$

$$31x - 9 = 270$$

$$31x = 279$$

$$x = 9$$

$$x = 9$$

$$m\widehat{AD} = 108^\circ$$

$$m\widehat{BC} = 23^\circ$$

$$m\widehat{DC} = 139^\circ$$

$$m\widehat{DBC} = 221^\circ$$

Name: _____

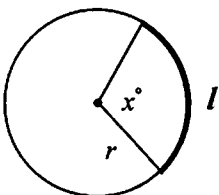
Date: _____

Topic: _____

Class: _____

Main Ideas/Questions

Notes/Examples

ARC LENGTH

The length of an arc is a portion of the circumference.

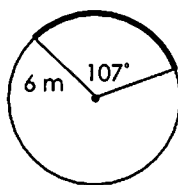
Arc Length Formula:

$$l = \frac{x \cdot c}{360}$$

 $x = \text{degree measure of central angle}$
 $c = \text{circumference}$
 $l = \text{arc length}$

Directions: Find the length of each bolded arc to the nearest hundredth.

1.



$$l = \frac{107 \cdot 2\pi 6}{360}$$

$$= \frac{1284\pi}{360}$$

$$\approx 11.21$$

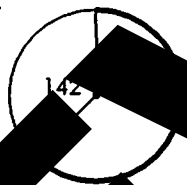


$$l = \frac{38 \cdot 2\pi 15}{360}$$

$$= \frac{1140\pi}{360}$$

$$\approx 9.95 \text{ in}$$

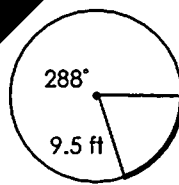
3.



$$l = \frac{142 \cdot 2\pi 4}{360}$$

$$= \frac{1136\pi}{360}$$

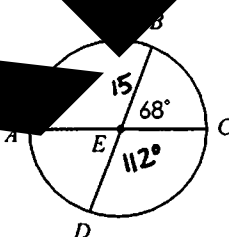
$$\approx 15.22 \text{ cm}$$



$$l = \frac{288 \cdot 2\pi 9.5}{360}$$

$$= \frac{1368\pi}{360}$$

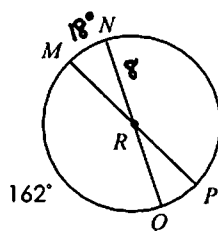
$$\approx 11.94 \text{ ft}$$

5. If $AB = 15$ centimeters, find the length of $\widehat{CD}$.

$$l = \frac{112 \cdot 30\pi}{360}$$

$$= \frac{3360\pi}{360}$$

$$\approx 29.32 \text{ cm}$$

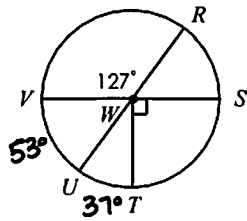
6. If $NR = 8$ feet, find the length of $\widehat{NMP}$.

$$l = \frac{198 \cdot 16\pi}{360}$$

$$= \frac{3168\pi}{360}$$

$$\approx 27.65 \text{ ft}$$

7. If $VS = 12$ meters, find the length of $\widehat{UT}$.

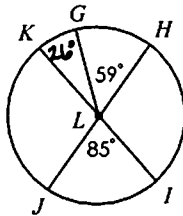


$$l = \frac{37 \cdot 12\pi}{360}$$

$$= \frac{444\pi}{360}$$

$$\approx 3.8$$

8. If $JH = 21$ inches, find the length of $\widehat{KJG}$.

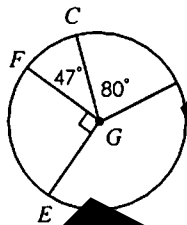


$$l = \frac{334 \cdot 21\pi}{360}$$

$$= \frac{7014\pi}{360}$$

$$\approx 61.21 \text{ in}$$

9. If $FG = 27$ yards, find the length of $\widehat{CD}$.



$$l = \frac{233.54\pi}{360}$$

$$\approx 109.8 \text{ yd}$$

10. If $VS = 97.9$ meters, find the length of $\widehat{TS}$.



$$l = \frac{97.9\pi}{360}$$

$$= \frac{873\pi}{360}$$

$$\approx 7.62 \text{ mm}$$

11. A pendulum swings through an angle of 40° . How far does the tip of the pendulum travel in a single swing?

$$l = \frac{40 \cdot 2\pi 16}{360}$$

$$= \frac{1280\pi}{360}$$

$$\approx 11.17 \text{ in}$$

12. A car entered a roundabout from Mason Avenue, traveled 280 feet, then turned onto Perry Street. If the roundabout has a diameter of 150 feet, find the angle of rotation to the nearest degree the car traveled.

$$280 = \frac{x \cdot 150\pi}{360}$$

$$\frac{100800}{150\pi} = \frac{x \cdot 150\pi}{150\pi}$$

$$x = 214^\circ$$

Name: _____

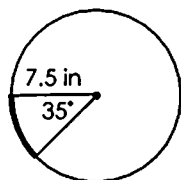
Unit 10: Circles

Date: _____ Per: _____

Homework 3: Arc Lengths

Directions: Find the length of each bolded arc. Round to the nearest hundredth.

1.

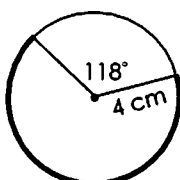


$$l = \frac{35 \cdot 2\pi \cdot 7.5}{360}$$

$$= \frac{525\pi}{360}$$

$$\approx \boxed{4.58 \text{ in}}$$

2.

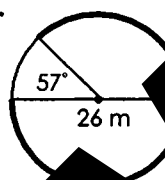


$$l = \frac{118 \cdot 2\pi \cdot 4}{360}$$

$$= \frac{1936\pi}{360}$$

$$\approx \boxed{16.87 \text{ m}}$$

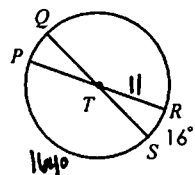
3.



$$l = \frac{57 \cdot 2\pi \cdot 26}{360}$$

$$= \frac{7818\pi}{360}$$

$$\approx \boxed{68.75 \text{ m}}$$

4. If $TR = 11$ ft, find the length of $\widehat{PS}$.

$$l = \frac{164 \cdot 2\pi \cdot 11}{360}$$

$$= \frac{3608\pi}{360}$$

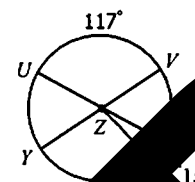
$$\approx \boxed{31.40 \text{ ft}}$$

5. If $LN = 10$ m, find the length of $\widehat{MKL}$.

$$l = \frac{88 \cdot 2\pi \cdot 10}{360}$$

$$= \frac{2180\pi}{360}$$

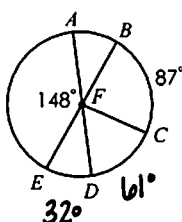
$$\approx \boxed{19.02 \text{ m}}$$

6. If $YV = 28$ in, find the length of $\widehat{YZ}$.

$$l = \frac{117 \cdot 2\pi \cdot 28}{360}$$

$$= \frac{7896\pi}{360}$$

$$\approx \boxed{68.91 \text{ in}}$$

7. If $AF = 23$ cm, find the length of $\widehat{EC}$.

$$l = \frac{148 \cdot 2\pi \cdot 23}{360}$$

$$= \frac{4278\pi}{360}$$

$$\approx \boxed{37.33 \text{ cm}}$$

8. The minute hand on a clock is 9 centimeters long and travels through an arc of 252° in 42 minutes. To the nearest tenth of a centimeter, how far does the minute hand travel during a 42-minute period?

$$l = \frac{252 \cdot 2\pi \cdot 9}{360}$$

$$= \frac{4536\pi}{360}$$

$$\approx \boxed{39.6 \text{ cm}}$$

9. A Ferris wheel has a diameter of 225 feet. If a passenger gets in a car and travels 38 feet when the wheel stops to let more passengers on, find the angle of rotation to the nearest degree.

$$38 = \frac{x \cdot 225\pi}{360}$$

$$\frac{13680}{225\pi} = \frac{x \cdot 225\pi}{225\pi}$$

$$x = \boxed{19^\circ}$$

Name: _____

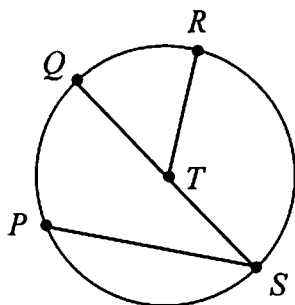
Geometry

Date: _____ Per: _____

Unit 10: Circles

Quiz 10-1: Intro to Circles, Central Angles & Arcs, Arc Lengths

Use the circle below for questions 1 – 7.



1. Name a radius.

2. Name a diameter.

3. Name a chord that is not a diameter.

4. Name a central angle.

5. Name a minor arc.

6. Name a major arc.

7. Name a semicircle.

$\overline{QT}$, $\overline{ST}$

3. $\overline{QS}$

$\angle RTS$

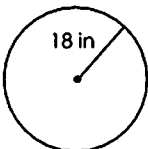
5. $\widehat{QR}$, $\widehat{RS}$, $\widehat{SP}$, $\widehat{QP}$

6. $\widehat{PRS}$, $\widehat{QRP}$, $\widehat{RSP}$

7. $\widehat{QPS}$, $\widehat{QRS}$

For questions 8 and 9, find the area and circumference. Round to the nearest hundredth.

8.

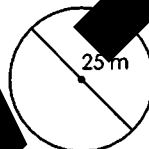


$$A = 1017.36 \text{ in}^2$$

$$C = 226.195$$

$$A = \pi(18)^2 = 324\pi$$

$$C = 2\pi(18)$$



$$A = 490.87 \text{ m}^2$$

$$C = 78.54 \text{ m}$$

$$A = \pi(12.5)^2 = 156.25\pi$$

$$C = 25\pi$$

10. If the area of a circle is 201.06 cm^2 , find its diameter and circumference.

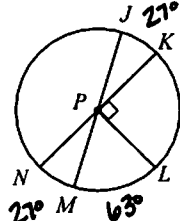
$$d = 16 \text{ cm}$$

$$C = 16\pi = 50.27$$

$$C = 50.27 \text{ cm}$$

$$r = 8 \rightarrow d = 16$$

If $\angle MPL = 63^\circ$, find each measure.



$$a) m\widehat{JK} = 27^\circ$$

$$d) m\widehat{KNM} = 207^\circ$$

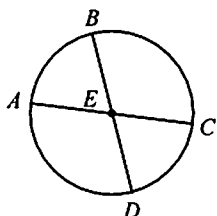
$$b) m\widehat{NJ} = 153^\circ$$

$$e) m\widehat{MJL} = 297^\circ$$

$$c) m\widehat{JL} = 117^\circ$$

$$f) m\widehat{JLK} = 333^\circ$$

12. If $m\widehat{AD} = (19x - 49)^\circ$ and $m\widehat{CD} = (5x + 37)^\circ$, find $m\widehat{CD}$.



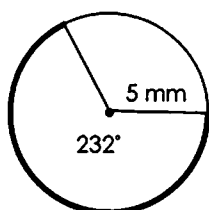
$$\begin{aligned} 19x - 49 + 5x + 37 &= 180 \\ 24x - 12 &= 180 \\ 24x &= 192 \\ x &= 8 \end{aligned}$$

12. $m\widehat{CD} = \underline{77^\circ}$

$$\begin{aligned} m\widehat{CD} &= 5(8) + 37 \\ &= 40 + 37 \\ &= 77 \end{aligned}$$

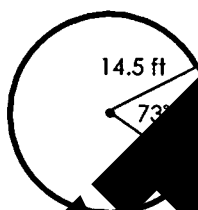
For questions 13 and 14, find the length of each bolded arc. Round to the nearest hundredth.

13.



$$\begin{aligned} l &= \frac{232 \cdot 2\pi \cdot 5}{360} \\ &= \frac{2320\pi}{360} \end{aligned}$$

14.

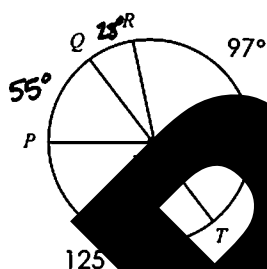


$$\begin{aligned} l &= \frac{73 \cdot 2\pi \cdot 14.5}{360} \\ &= \frac{8323\pi}{360} \end{aligned}$$

13. $\underline{20.25 \text{ mm}}$

14. $\underline{72.63 \text{ ft}}$

15. Using the circle below, find each arc length. Round to the nearest hundredth.



a) $\underline{13.44 \text{ ft}}$

$$\begin{aligned} l &= \frac{55 \cdot 2\pi \cdot 18}{360} \\ &= \frac{1540\pi}{360} \end{aligned}$$

b) $\widehat{RPT} \quad \underline{50.82 \text{ ft}}$

$$\begin{aligned} l &= \frac{208 \cdot 2\pi \cdot 18}{360} \\ &= \frac{5824\pi}{360} \end{aligned}$$

A merry-go-round has a radius of 18 feet. If a passenger gets on a horse located at the edge of the wheel and travels 38 feet, find the angle of rotation to the nearest degree.

$$38 = \frac{x \cdot 2\pi \cdot 18}{360}$$

$$\frac{13680}{36\pi} = \frac{x \cdot 36\pi}{36\pi}$$

$$x = 121$$

16. $\underline{121^\circ}$

Name:

Date:

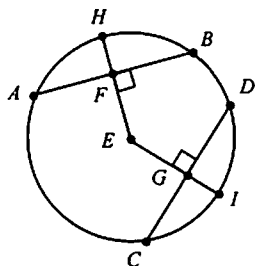
Topic:

Class:

Main Ideas/Questions

Notes/Examples

Congruent CHORDS & ARCS



- Two chords are congruent if and only if:

a) Their corresponding arcs are congruent.

$$\underline{AB = CD} \leftrightarrow \underline{m\widehat{AB} = m\widehat{CD}}$$

b) They are equidistant from the center.

$$\underline{AB = CD} \leftrightarrow \underline{EF = EG}$$

- If a diameter or radius is perpendicular to a chord, then it bisects the chord and the arc.

$$\underline{EH \perp AB} \quad \underline{AF = FB} \quad \underline{m\widehat{AH} = m\widehat{HB}}$$

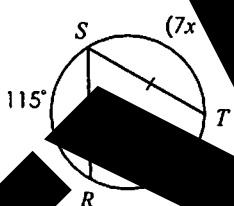
Directions: Find the indicated value.

1. Find x .

$$7x + 24 = 115$$

$$7x = 91$$

$$\boxed{x = 13}$$

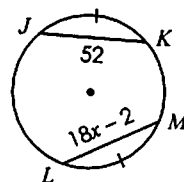


2. Find x .

$$18x - 2 = 32$$

$$18x = 54$$

$$\boxed{x = 3}$$



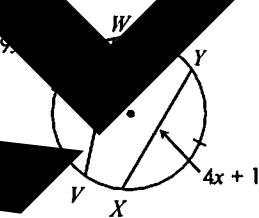
3. Find XY .

$$9x - 34 = 14$$

$$5x - 34 = 14$$

$$5x = 48$$

$$XY = (7) + 1 = \boxed{8}$$



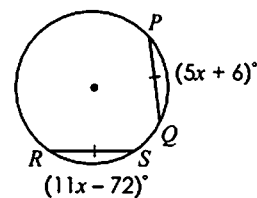
4. Find $m\widehat{RS}$.

$$11x - 72 = 5x + 6$$

$$6x - 72 = 6$$

$$6x = 78$$

$$x = 13$$



$$m\widehat{RS} = 11(13) - 72 = \boxed{71^\circ}$$

6. If $MP = 5x - 34$ and $PN = 2x - 4$, find MP .

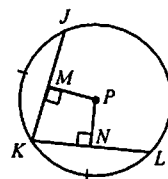
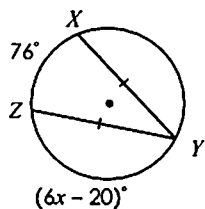
$$5x - 34 = 2x - 4$$

$$3x - 34 = -4$$

$$3x = 30$$

$$x = 10$$

$$MP = 5(10) - 34 = \boxed{16}$$



7. If $DE = 11x + 15$ and $FG = 32x - 27$, find DE .

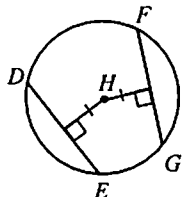
$$32x - 27 = 11x + 15$$

$$21x - 27 = 15$$

$$21x = 42$$

$$x = 2$$

$$DE = 11(2) + 15 = \boxed{37}$$



8. Find $m\widehat{MP}$.

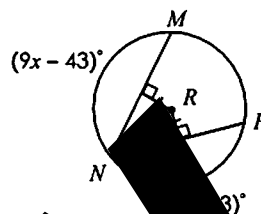
$$9x - 43 = 5x + 33$$

$$4x - 43 = 33$$

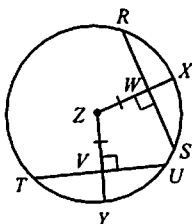
$$4x = 76$$

$$x = 19$$

$$m\widehat{MN} = 9(19) - 43 = 118$$



9. In circle Z, if $RS = 18$, and $m\widehat{TY} = 42^\circ$, find each measure.



$$TV = \underline{9}$$

$$TU = \underline{18}$$

$$WS = \underline{9}$$

$$m\widehat{YU} = \underline{42^\circ}$$

$$m\widehat{RS} = \underline{84^\circ}$$

10. In circle I, if $BE = 17$, and $m\widehat{AC} = 34^\circ$, find each measure.

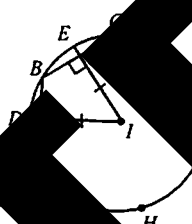
$$BE = \underline{34}$$

$$FB = \underline{17}$$

$$m\widehat{AB} = \underline{52^\circ}$$

$$m\widehat{BC} = \underline{52^\circ}$$

$$m\widehat{EC} = \underline{26^\circ}$$



11. If $QM = 6x - 11$ and $MR = 2x + 9$, find MN .

$$6x - 11 = 2x + 9$$

$$4x - 11 = 9$$

$$4x = 20$$

$$x = 5$$

$$MR = 2(5) + 9 = 19$$



12. If $m\widehat{CD} = 5^\circ$ and $m\widehat{EF} = (12x - 8)^\circ$, find $m\widehat{AC}$.

$$(7x - 15) = 12x - 8$$

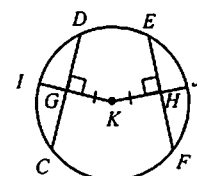
$$4x - 30 = 12x - 8$$

$$2x - 30 = -8$$

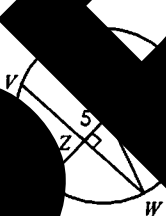
$$2x = 22$$

$$x = 11$$

$$m\widehat{AC} = 7(11) - 15 = \boxed{62^\circ}$$



Use the circle below for questions 13 and 14.



$$5^2 = 132$$

$$x^2 + 25 = 169$$

$$x^2 = 144$$

$$x = 12$$

$$\boxed{VW = 24}$$

14. Find $m\widehat{YW}$.

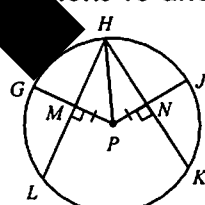
$$\cos y = \frac{5}{13}$$

$$y = \cos^{-1}\left(\frac{5}{13}\right)$$

$$y = 67.4$$

$$\boxed{m\widehat{YW} = 67.4^\circ}$$

Use the circle below for questions 15 and 16.



$HK = 30$ and $PM = 8$

15. Find PH .

$$8^2 + 15^2 = x^2$$

$$289 = x^2$$

$$17 = x$$

$$\boxed{PH = 17}$$

16. Find $m\widehat{GJ}$.

$$\tan y = \frac{15}{8}$$

$$y = \tan^{-1}\left(\frac{15}{8}\right)$$

$$y = 61.9$$

$$\boxed{m\widehat{GJ} = 123.9^\circ}$$

Name: _____

Unit 10: Circles

Date: _____ Per: _____

Homework 4: Congruent Chords & Arcs

** This is a 2-page document! **

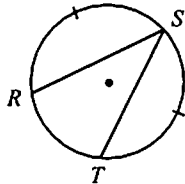
Directions: Find each value or measure.

1. If
- $RS = 59$
- and
- $ST = 10x - 31$
- , find
- x
- .

$$10x - 31 = 59$$

$$10x = 90$$

$$x = 9$$



2. If
- $m\widehat{JK} = (7x - 39)^\circ$
- and
- $m\widehat{ML} = 87^\circ$
- , find
- x
- .

$$7x - 39 = 87$$

$$7x = 126$$

$$x = 18$$



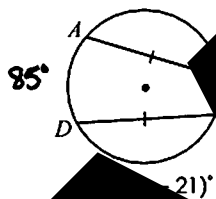
3. If
- $m\widehat{AD} = 85^\circ$
- and
- $m\widehat{BC} = 31^\circ$
- , find the value of
- x
- .

$$2(13x - 21) = 244$$

$$26x - 42 = 244$$

$$26x = 286$$

$$x = 11$$



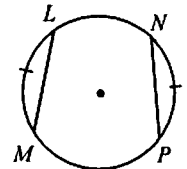
4. If
- $m\widehat{LM} = 41 - 2x$
- and
- $m\widehat{NP} = 7x + 5$
- , find
- LM
- .

$$41 - 2x = 7x + 5$$

$$41 - 5 = 7x$$

$$36 = 7x$$

$$x = 4$$



$$LM = 41 - 2(4) = 33$$

5. If
- $m\widehat{UV} = (8x - 17)^\circ$
- and
- $m\widehat{WV} = (5x + 52)^\circ$
- , find
- $m\widehat{WV}$
- .

$$8x - 17 = 5x + 52$$

$$3x = 69$$

$$x = 23$$

$$m\widehat{WV} = 5(23) = 115^\circ$$



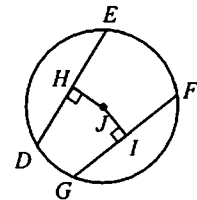
6. If
- $DE = GF$
- ,
- $HJ = 3x + 20$
- and
- $JI = 15x - 64$
- , find
- JI
- .

$$3x + 20 = 15x - 64$$

$$20 = 12x - 64$$

$$84 = 12x$$

$$x = 7$$



$$JI = 15(7) - 64 = 41$$

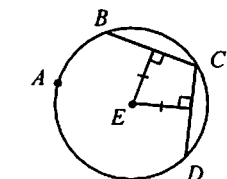
7. If
- $m\widehat{AB} = (9x - 53)^\circ$
- and
- $m\widehat{CD} = (2x + 45)^\circ$
- , find
- $m\widehat{BAD}$
- .

$$9x - 53 = 2x + 45$$

$$7x = 98$$

$$x = 14$$

$$m\widehat{BC} = 9(14) - 53 = 73^\circ$$



$$m\widehat{BAD} = 214^\circ$$

8. If
- $m\widehat{LM} = (8x - 56)^\circ$
- and
- $m\widehat{NP} = (5x + 22)^\circ$
- , find
- $m\widehat{LP}$
- .

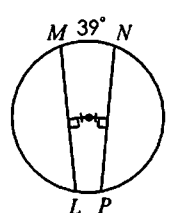
$$8x - 56 = 5x + 22$$

$$3x - 56 = 22$$

$$3x = 78$$

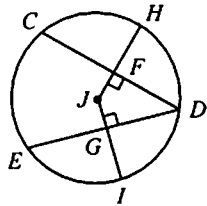
$$x = 26$$

$$m\widehat{LM} = 8(26) - 56 = 152^\circ$$



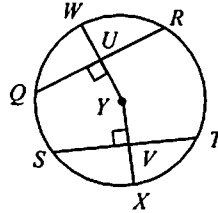
$$m\widehat{LP} = 17^\circ$$

9. If $JG = JF$, $GD = 13$, and $m\widehat{CD} = 136^\circ$, find each measure.



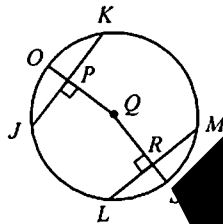
$$\begin{aligned} ED &= 26 \\ CF &= 13 \\ m\widehat{ED} &= 136^\circ \\ m\widehat{HD} &= 48^\circ \\ m\widehat{CE} &= 88^\circ \end{aligned}$$

10. If $YU = YV$, $ST = 16$, $m\widehat{QS} = 34^\circ$, and $m\widehat{RT} = 98^\circ$, find each measure.



11. If $PQ = QR$, $JK = 3x + 23$ and $LM = 9x - 19$, find PK .

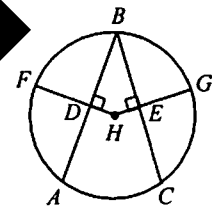
$$\begin{aligned} 9x - 19 &= 3x + 23 \\ 6x &= 42 \\ x &= 7 \end{aligned}$$



$$JK = 3(7) + 23 = 44$$

$$PK = 22$$

12. If $DH \perp BC$, $m\widehat{BC} = (x - 20)^\circ$ and $m\widehat{AC} = 114^\circ$, find $m\widehat{AB}$.

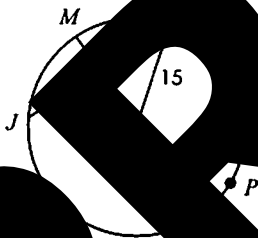


$$\begin{aligned} 20 &= 5x \\ x &= 4 \end{aligned}$$

$$m\widehat{BC} = 4(12) - 20 = 88^\circ$$

$$m\widehat{AB} = 176^\circ$$

Use the circle below for questions 13 - 16.



13. Find NK .

$$\begin{aligned} 12^2 + x^2 &= 15^2 \\ x^2 &= 144 \\ x &= 12 \end{aligned}$$

$$NK = 12$$

14. Find $m\widehat{MK}$.

$$\begin{aligned} \cos y &= 9/15 \\ y &= \cos^{-1}(9/15) \\ y &= 53.1^\circ \end{aligned}$$

$$m\widehat{MK} = 53.1^\circ$$

15. Find JK .

$$2(12) = 24$$

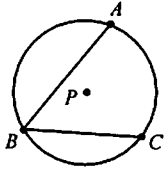
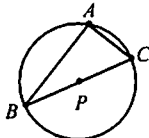
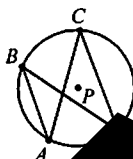
$$JK = 24$$

16. Find $m\widehat{JPK}$.

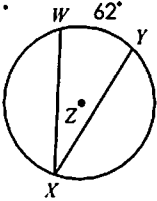
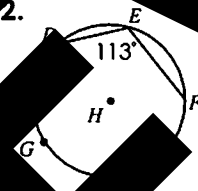
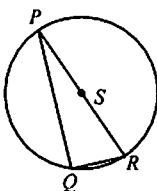
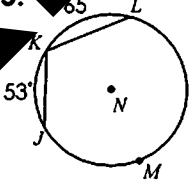
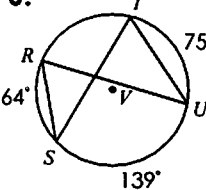
$$2(53.1) = 106.2$$

$$m\widehat{JPK} = 253.8^\circ$$

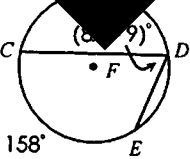
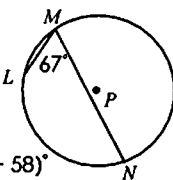
Name:		Date:	
Topic:		Class:	

Main Ideas/Questions	Notes/Examples
INSCRIBED ANGLES  $m\angle ABC = \frac{1}{2} m\widehat{AC}$	- An inscribed angle is an angle with its vertex <u>on</u> the circle with two sides that are <u>chords</u>. - An intercepted arc is the arc that lies between the <u>ends</u> of an inscribed angle. - The measure of the inscribed angle is equal to <u>half</u> the measure of its intercepted arc.
INTERCEPTING a Diameter	 If an inscribed angle <u>intercepts</u> a <u>diameter</u>, then it is a <u>right</u> angle. $m\angle BAC = \underline{90^\circ}$
OVERLAPPING Arcs	 If inscribed angles <u>intercept</u> the <u>same arc</u>, the angles are <u>congruent</u>. $m\angle ABC = \underline{m\angle ADC}$

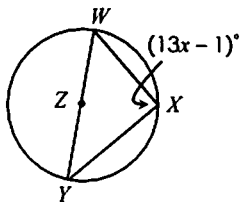
Directions: Find each angle and arc measure.

1.  $m\widehat{WY} = 62^\circ$ $m\angle WXY = \underline{31^\circ}$	2.  $m\angle EFG = 113^\circ$ $m\widehat{DGF} = \underline{226^\circ}$	3.  $m\angle PQR = \underline{90^\circ}$
4.  $m\angle KJL = 47^\circ$ $m\widehat{BC} = \underline{86^\circ}$	5.  $m\angle KJL = 53^\circ$ $m\angle JKL = \underline{121^\circ}$	6.  $m\angle RST = \underline{41^\circ}$ $m\angle RUT = \underline{41^\circ}$

7. Find each value or measure.

 $m\angle CDE = 158^\circ$ $m\angle CDE = (8x - 9)^\circ$ $8x - 9 = 158$ $8x = 167$ $x = \underline{20.875}$	8. Solve for x.  $m\angle MLN = 67^\circ$ $m\angle MLN = (4x + 58)^\circ$ $67 = 4x + 58$ $9 = 4x$ $x = \underline{2.25}$
---	---

9. Solve for x .

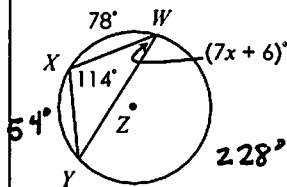


$$13x - 1 = 90$$

$$13x = 91$$

$$x = 7$$

10. Solve for x .

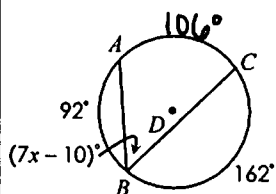


$$7x + 6 = 27$$

$$7x = 21$$

$$x = 3$$

11. Solve for x .

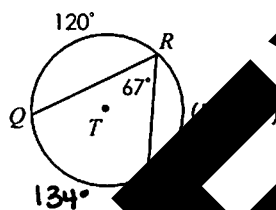


$$7x - 10 = 53$$

$$7x = 63$$

$$x = 9$$

12. Solve for x .

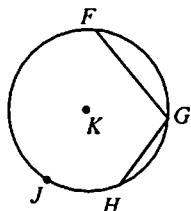


$$5x + 2 = 10$$

$$5x = 8$$

$$x = 1.6$$

13. If $m\angle FGH = (6x + 21)^\circ$ and $m\widehat{FJH} = (17x - 28)^\circ$, find $m\angle FGH$.



$$2(6x + 21) = 17x - 28$$

$$12x + 42 = 17x - 28$$

$$42 = 5x - 28$$

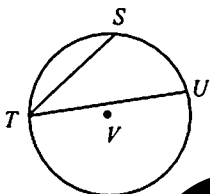
$$70 = 5x$$

$$x = 14$$

$$m\widehat{FJH} = 17(14) - 28$$

$$= 210^\circ$$

14. If $m\angle STU = (5x - 16)^\circ$ and $m\widehat{STU} = 12x - 50$, find $m\angle STU$.



$$(5x - 16) = 12x - 50$$

$$10x - 32 = 12x - 50$$

$$-32 = 2x - 50$$

$$18 = 2x$$

$$x = 9$$

$$m\angle STU = 5(9) - 16$$

$$= 29^\circ$$

15. If $m\angle ABD = (6x + 26)^\circ$ and $m\angle ACD = (13x - 9)^\circ$, find $m\widehat{AD}$.



$$6x + 26 = 13x - 9$$

$$26 = 7x - 9$$

$$35 = 7x$$

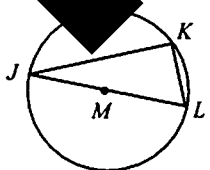
$$x = 5$$

$$m\angle ABD = 6(5) + 26$$

$$= 56^\circ$$

$$m\widehat{AD} = 112^\circ$$

16. If $m\angle KJL = (3x + 2)^\circ$ and $m\angle KLJ = (7x - 32)^\circ$, find $m\widehat{KL}$.



$$10x - 30 = 90$$

$$10x = 120$$

$$x = 12$$

$$m\angle KJL = 3(12) + 2 = 38^\circ$$

$$m\widehat{KL} = 76^\circ$$

Name:

Date:

Topic:

Class:

Main Ideas/Questions

Notes/Examples

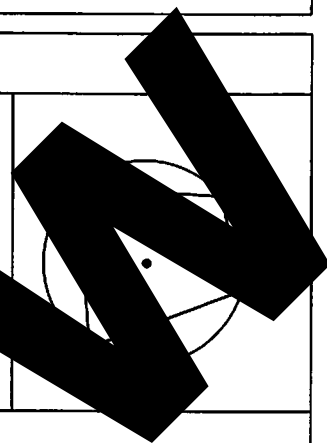
Inscribed QUADRILATERALS

If a quadrilateral is inscribed in a circle, then its opposite angles are Supplementary.

In circle P to the right:

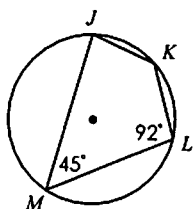
$$m\angle A + m\angle C = 180^\circ$$

$$\text{and } m\angle B + m\angle D = 180^\circ$$



Directions: Find each value or measure.

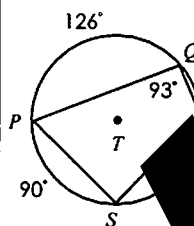
1.



$$m\angle J = 88^\circ$$

$$m\angle K = 135^\circ$$

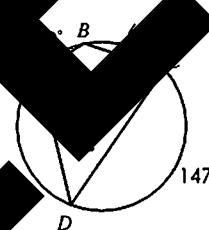
2.



$$m\angle Q = 72^\circ$$

$$m\angle R = 90^\circ$$

$$m\angle S = 120^\circ$$

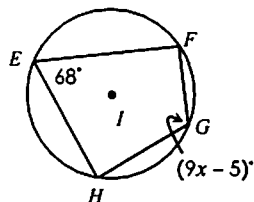


$$m\angle A = 104^\circ$$

$$m\angle B = 130^\circ$$

$$m\angle C = 76^\circ$$

$$m\angle D = 50^\circ$$

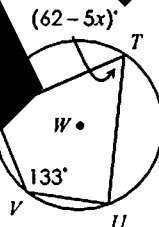
4. Solve for x .

$$9x - 5 + 68 = 180$$

$$9x + 63 = 180$$

$$9x = 117$$

$$x = 13$$

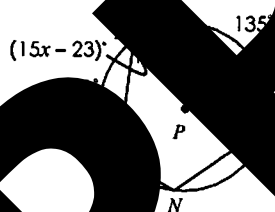
Solve for x .

$$62 - 5x + 133 = 180$$

$$-5x + 195 = 180$$

$$-5x = -15$$

$$x = 3$$

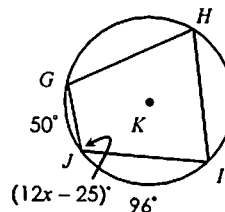
6. Solve for x .

$$15x - 23 + 135 = 180$$

$$15x + 112 = 180$$

$$15x = 68$$

$$x = 6$$

7. Solve for x .

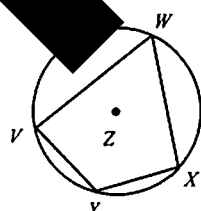
$$12x - 25 + 73 = 180$$

$$12x + 48 = 180$$

$$12x = 132$$

$$x = 11$$

If $m\angle X = (5x + 1)^\circ$ and $m\angle Y = (13x - 37)^\circ$, find $m\angle Y$.



$$5x + 1 + 13x - 37 = 180$$

$$18x - 36 = 180$$

$$18x = 216$$

$$x = 12$$

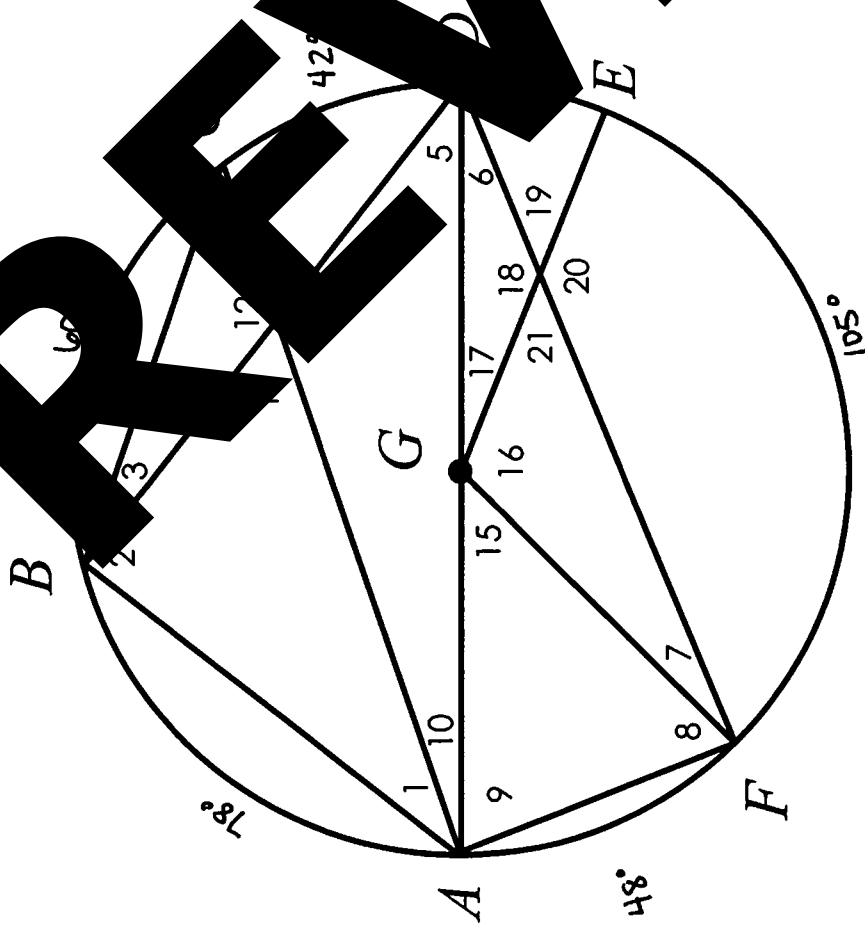
$$m\angle Y = 13(12) - 37$$

$$= 119^\circ$$

Circle Challenge!

Name: _____

Date: _____ Period: _____



Given: G is the center of the circle
 $\overline{AD}$ is a diameter, $m\widehat{AB} = 78^\circ$,
 $m\widehat{FE} = 105^\circ$, $m\widehat{ED} = 27^\circ$, $m\widehat{CD} = 42^\circ$

Find each angle measure:

$m\angle 1 = 30^\circ$

$m\angle 12 = 120^\circ$

$m\angle 2 = 90^\circ$

$m\angle 13 = 60^\circ$

$m\angle 3 = 21^\circ$

$m\angle 14 = 120^\circ$

$m\angle 4 = 39^\circ$

$m\angle 15 = 48^\circ$

$m\angle 5 = 39^\circ$

$m\angle 16 = 105^\circ$

$m\angle 6 = 24^\circ$

$m\angle 17 = 27^\circ$

$m\angle 7 = 21^\circ$

$m\angle 18 = 129^\circ$

$m\angle 8 = 15^\circ$

$m\angle 19 = 51^\circ$

$m\angle 9 = 66^\circ$

$m\angle 20 = 129^\circ$

$m\angle 10 = 21^\circ$

$m\angle 21 = 51^\circ$

$m\angle 11 = 60^\circ$

Name: _____

Unit 10: Circles

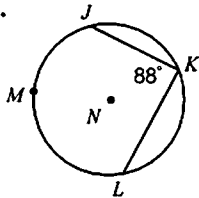
Date: _____ Per: _____

Homework 5: Inscribed Angles

** This is a 2-page document! **

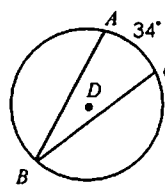
Directions: Find each angle or arc measure.

1.



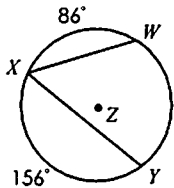
$$m\widehat{JML} = 176^\circ$$

2.



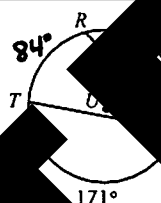
$$m\widehat{AC} = 17^\circ$$

3.



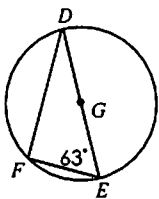
$$m\angle WXY = 59^\circ$$

4.



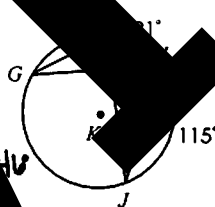
$$m\widehat{RS} = 105^\circ$$

5.



$$m\widehat{DE} = 126^\circ$$

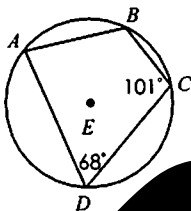
6.



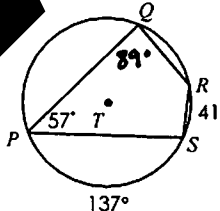
$$m\angle GHJ = 73^\circ$$

$$m\angle GIJ = 73^\circ$$

7.



$$m\angle A = 70^\circ$$



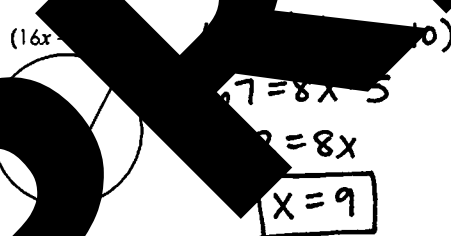
$$m\angle Q = 89^\circ$$

$$m\angle R = 123^\circ$$

$$m\angle S = 91^\circ$$

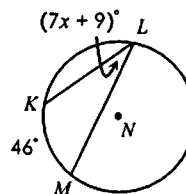
Directions: Find the value of x.

9.



$$x = 9$$

10.



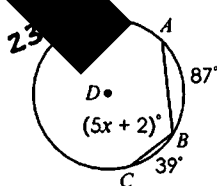
$$7x + 9 = \frac{1}{2}(46)$$

$$7x + 9 = 23$$

$$7x = 14$$

$$x = 2$$

11.



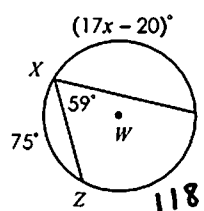
$$5x + 2 = \frac{1}{2}(234)$$

$$5x + 2 = 117$$

$$5x = 115$$

$$x = 23$$

12.

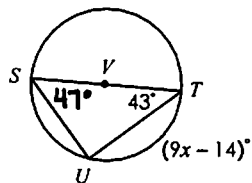


$$17x - 20 = 167$$

$$17x = 187$$

$$x = 11$$

13.



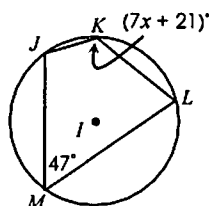
$$2(47) = 9x - 14$$

$$94 = 9x - 14$$

$$108 = 9x$$

$$\boxed{x = 12}$$

14.



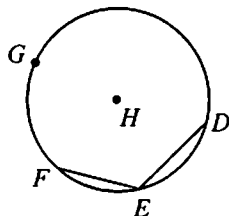
$$7x + 21 + 47 = 180$$

$$7x + 68 = 180$$

$$7x = 112$$

$$\boxed{x = 16}$$

15. If $m\angle DEF = (6x + 37)^\circ$ and $m\widehat{FGD} = (19x - 31)^\circ$, find $m\angle DEF$.



$$2(6x + 37) = 19x - 31$$

$$12x + 74 = 19x - 31$$

$$74 + 31 = 19x - 12x$$

$$105 = 7x$$

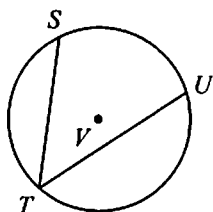
$$x = 15$$

$$m\angle DEF =$$

$$6(15) + 37$$

$$= 127^\circ$$

16. If $m\angle STU = (13x - 6)^\circ$, $m\widehat{SU} = (21x + 8)^\circ$, and $m\widehat{UT} = 143^\circ$, find $m\angle STU$.



$$2(13x - 6) = 21x + 8 + 143$$

$$26x - 12 = 21x + 151$$

$$5x = 163$$

$$5x = 163$$

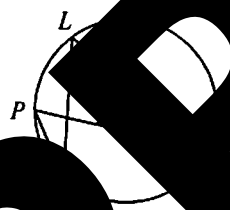
$$x = 4$$

$$m\widehat{SU} = 21(4) + 8$$

$$= 92^\circ$$

$$\boxed{m\angle STU = 125^\circ}$$

17. If $m\angle LMP = (5x - 19)^\circ$ and $m\widehat{LP} = (2x + 11)^\circ$, find $m\angle LMP$.



$$5x - 19 = 2x + 11$$

$$3x - 19 = 11$$

$$3x = 30$$

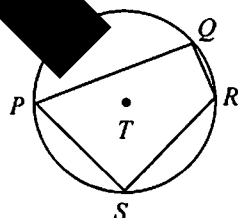
$$x = 10$$

$$m\angle LMP = 5(10) - 19$$

$$= 31^\circ$$

$$\boxed{m\angle LMP = 31^\circ}$$

18. If $m\angle P = (4x - 1)^\circ$ and $m\angle R = (12x - 27)^\circ$, find $m\widehat{QPS}$.



$$4x - 1 + 12x - 27 = 180$$

$$16x - 28 = 180$$

$$16x = 208$$

$$x = 13$$

$$m\angle R = 12(13) - 27$$

$$= 129^\circ$$

$$\boxed{m\widehat{QPS} = 2(129) = 258^\circ}$$

Name:

Date:

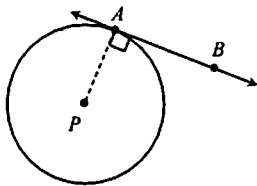
Topic:

Class:

Main Ideas/Questions

Notes/Examples

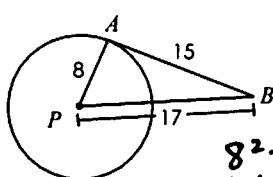
TANGENT LINES



- A **tangent line** intersects a circle at exactly one point, called the **point of tangency**.
- A line is tangent to a circle if and only if it is perpendicular to a radius drawn to the point of tangency.

Directions: Determine if $\overline{AB}$ is tangent to circle P.

1.



Yes!

$$8^2 + 15^2 = 17^2$$

$$64 + 225 = 289$$

$$289 = 289$$



$$11^2 + 14^2 = 17^2$$

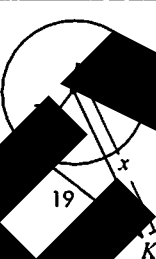
$$121 + 196 = 256$$

$$317 \neq 256$$

No!

Directions: If $\overline{JK}$ is tangent to circle L.

3.

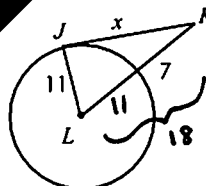


$$11^2 + x^2 = 18^2$$

$$121 + x^2 = 324$$

$$x^2 = 203$$

$$x = 14.2$$



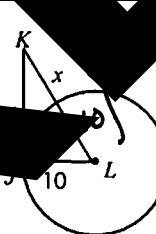
$$11^2 + x^2 = 18^2$$

$$121 + x^2 = 324$$

$$x^2 = 203$$

$$x = 14.2$$

5.



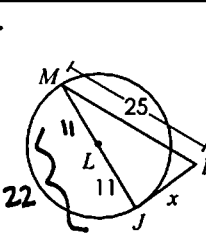
$$10^2 + x^2 = 26^2$$

$$100 + x^2 = 676$$

$$x^2 = 576$$

$$x = 24$$

6.



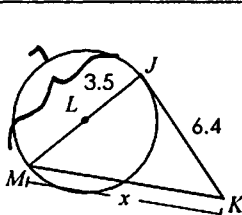
$$11^2 + x^2 = 25^2$$

$$121 + x^2 = 625$$

$$x^2 = 504$$

$$x = 22.4$$

7.



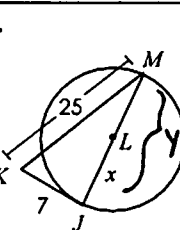
$$3.5^2 + 6.4^2 = x^2$$

$$12.25 + 40.96 = x^2$$

$$53.21 = x^2$$

$$x = 7.3$$

8.



$$7^2 + x^2 = 25^2$$

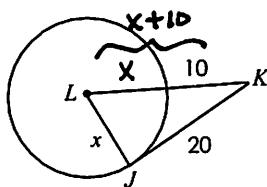
$$49 + x^2 = 625$$

$$x^2 = 576$$

$$x = 24$$

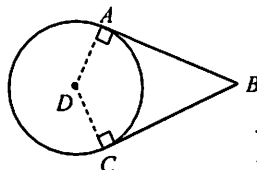
MORE TANGENT LINE Properties

9.

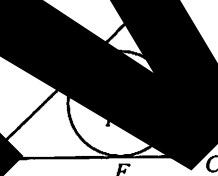


$$\begin{aligned}x^2 + 20^2 &= (x+10)^2 \\x^2 + 400 &= x^2 + 20x + 100 \\400 &= 20x + 100 \\300 &= 20x \\x &= 15\end{aligned}$$

If two segments from the same external point are tangent to a circle, then they are **congruent**.



If a polygon is circumscribed about a circle, then all its sides are tangent to the circle.



Directions: Find each value or measure. Name the segments that appear to be tangent and congruent.

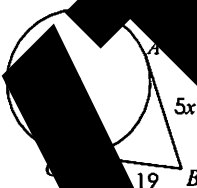
10. Find x .

$$8x - 19 = 5x + 23$$

$$3x - 19 = 23$$

$$3x = 42$$

$$x = 14$$



11. Find PQ .

$$14x - 13 = 8x + 5$$

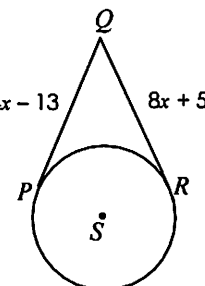
$$6x - 13 = 5$$

$$6x = 18$$

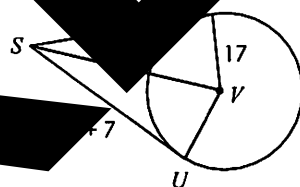
$$x = 3$$

$$PQ = 14(3) - 13$$

$$PQ = 29$$



12. Find SV .



$$10x - 41 = 4x + 7$$

$$6x - 41 = 7$$

$$6x = 48$$

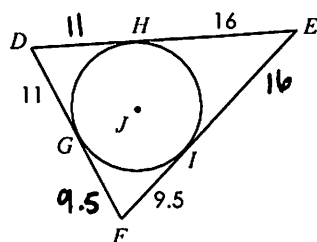
$$x = 8$$

$$\begin{aligned}ST &= 10(8) - 41 \\&= 39\end{aligned}$$

$$\begin{aligned}y^2 &= 39^2 + 17^2 \\y^2 &= 810\end{aligned}$$

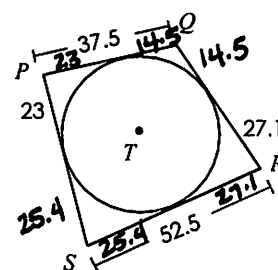
$$y = 42.5$$

13. Find the perimeter of $\triangle DEF$.



$$\text{Perimeter} = 13$$

14. Find the perimeter of quadrilateral PQRS.



$$\text{Perimeter} = 180$$

Name: _____

Unit 10: Circles

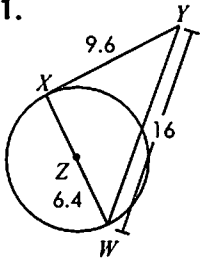
Date: _____ Per: _____

Homework 6: Tangent Lines

** This is a 2-page document! **

Determine if $\overline{XY}$ is tangent to circle Z.

1.

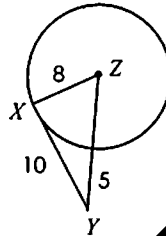


$$9.6^2 + 12.8^2 = 16^2$$

$$256 = 256$$

Yes!

2.



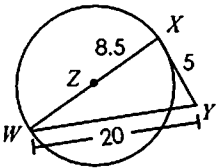
$$8^2 + 5^2 = 10^2$$

$$16 + 25 = 100$$

$$41 \neq 100$$

No!

3.

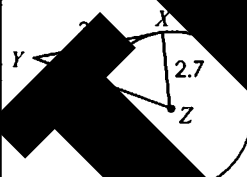


$$5^2 + 17^2 = 20^2$$

$$314 \neq 400$$

No!

4.



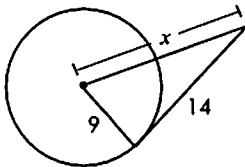
$$2.7^2 + 3.6^2 = 4.5^2$$

$$20.25 = 20.25$$

Yes!

Find the value of x. Assume that segments that appear to be tangent are tangent.

5.



$$9^2 + 14^2 = x^2$$

$$225 + 196 = x^2$$

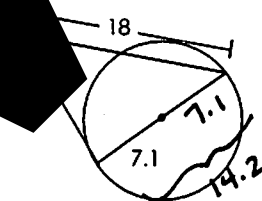
$$421 = x^2$$

$$x = \sqrt{421}$$

$$x \approx 20.5$$

x = 20.5

6.



$$x^2 + 14.2^2 = 18^2$$

$$x^2 + 201.64 = 324$$

$$x^2 = 122.36$$

$$x = 11.1$$

x = 11.1

7.



$$32^2 = x^2 + 12^2$$

$$1024 = x^2 + 144$$

$$880 = x^2$$

$$x = \sqrt{880}$$

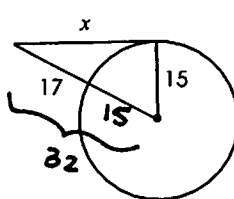
$$x \approx 29.7$$

$$40 = x + 24$$

$$x = 16$$

x = 16

8.



$$x^2 + 15^2 = 32^2$$

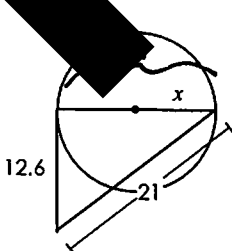
$$x^2 + 225 = 1024$$

$$x^2 = 799$$

$$x = 28.3$$

x = 28.3

9.



$$y^2 + 12.6^2 = 21^2$$

$$y^2 + 158.76 = 441$$

$$y^2 = 282.24$$

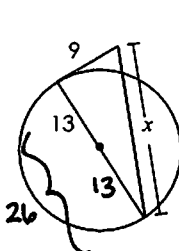
$$y = 16.8$$

$$2x = 16.8$$

$$x = 8.4$$

x = 8.4

10.



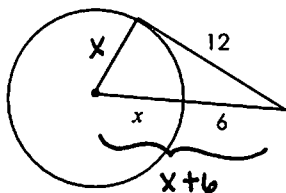
$$9^2 + 26^2 = x^2$$

$$157 = x^2$$

$$x = 27.5$$

x = 27.5

11.



$$x^2 + 12^2 = (x+6)^2$$

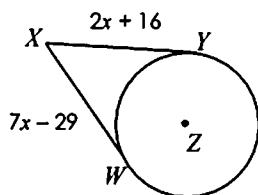
$$x^2 + 144 = x^2 + 12x + 36$$

$$144 = 12x + 36$$

$$108 = 12x$$

$$x = 9$$

Find each value or measure. Assume that segments that appear to be tangent are tangent.

12. Find WX .

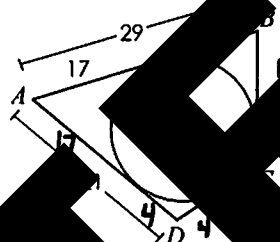
$$2x + 16 = 7x - 29$$

$$16 = 5x - 29$$

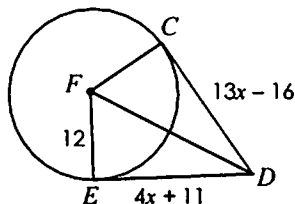
$$45 = 5x$$

$$x = 9$$

$$WX = 7(9) - 29 = 34$$

13. Find the perimeter of $\triangle ABC$.

$$\text{Perimeter} = 71$$

14. Find FD .

$$4x + 11 = 13$$

$$27 = 9x$$

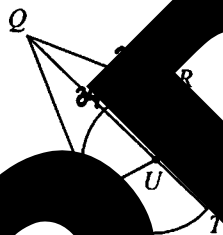
$$x = 3$$

$$FD = 4(3) + 11 = 23$$

$$12^2 + 23^2 = y^2$$

$$673 = y^2$$

$$y = 25.9$$

15. If $PQ = 4x + 2$, $OR = 7x - 19$, and $QU = 3x - 19$, find ST .

$$4x + 2 = 7x - 19$$

$$21 = 3x$$

$$x = 7$$

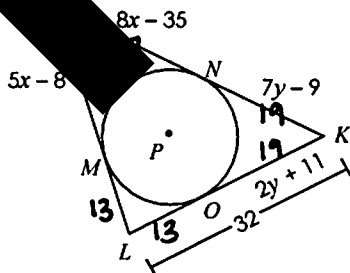
$$PQ = 4(7) + 2 = 30$$

$$30^2 + x^2 = 34^2$$

$$x^2 = 256$$

$$x = 16$$

$$ST = 32$$

Find the perimeter of $\triangle JKL$.

$$7y - 9 = 2y + 11$$

$$7y = 2y + 20$$

$$5y = 20$$

$$y = 4$$

$$OK = 2(4) + 11 = 19$$

$$5x - 8 = 8x - 35$$

$$-8 = 3x - 35$$

$$27 = 3x$$

$$x = 9$$

$$JN = 8(9) - 35 = 37$$

$$\text{Perimeter} = 138$$

Name: _____

Geometry

Date: _____ Per: _____

Unit 10: Circles

Quiz 10-2: Congruent Chords & Arcs, Inscribed Angles, & Tangent Line

For questions 1 and 2, find each value or measure.

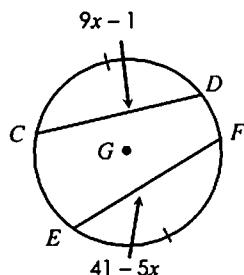
1. $EF = \underline{26}$

$$9x - 1 = 41 - 5x$$

$$14x = 42$$

$$x = 3$$

$$EF = 41 - 5(3) = 26$$



2. $x = \underline{15}$

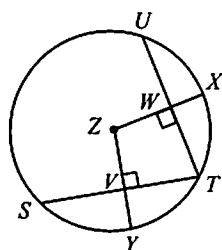
$$2(10x - 23) = 254$$

$$20x - 46 = 254$$

$$20x = 280$$

$$x = 15$$

3. In circle Z, if $VZ = ZW$, $SV = 21$, and $m\widehat{UT} = 112^\circ$, find each measure.



a) $ST = \underline{42}$

d) $m\widehat{XT} = \underline{56^\circ}$

b) $UV = \underline{21}$

e) $m\widehat{ST} = \underline{112^\circ}$

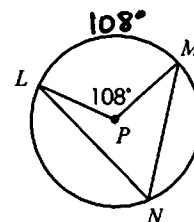
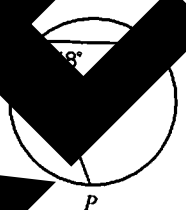
c) $SW = \underline{21}$

f) $m\widehat{US} = \underline{136^\circ}$

For questions 4-9, find each value or measure.

4. $m\widehat{RP} = \underline{136^\circ}$

5. $m\angle LNM = \underline{54^\circ}$



6. $m\angle K = \underline{83^\circ}$

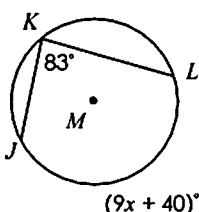
7. $m\angle ABC = \underline{51^\circ}$

$$20x - 9x + 40 = 166$$

$$11x + 40 = 166$$

$$11x = 126$$

$$x = 11$$

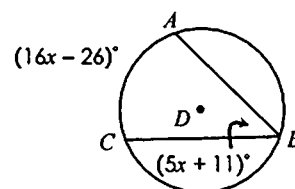


$$5x + 11 = \frac{1}{2}(16x - 26)$$

$$5x + 11 = 8x - 13$$

$$24 = 3x$$

$$x = 8$$



$$m\angle ABC = 5(8) + 11 = 51^\circ$$

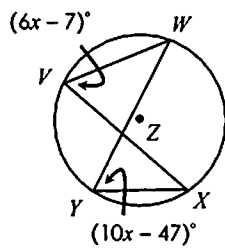
8. $m\widehat{WX} = 106^\circ$

$6x - 7 = 10x - 47$

$40 = 4x$

$x = 10$

$m\angle WVX = 6(10) - 7 = 53^\circ$



9. $m\angle DGF = 75^\circ$

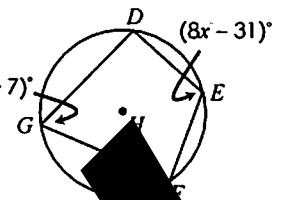
$4x + 7 + 8x - 31 = 180$

$12x - 24 = 180$

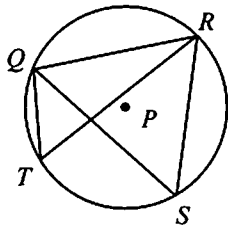
$12x = 204$

$x = 17$

$m\angle DGF = 4(17) + 7 = 75^\circ$



10. In circle P, if $m\widehat{QR} = 110^\circ$, $m\widehat{RS} = 94^\circ$, and $m\angle QRT = 27^\circ$, find each measure.



a) $m\angle QTR = 55^\circ$

d) $m\angle RS =$

b) $m\angle RQS = 47^\circ$

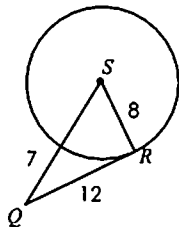
$m\angle QRS = 55^\circ$

c) $m\widehat{TS} = 102^\circ$

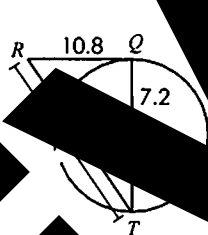
$= 54^\circ$

11. In which of the following diagrams is $\overline{QR}$ tangent to the circle? Circle the best answer.

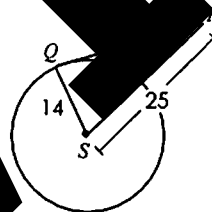
A.



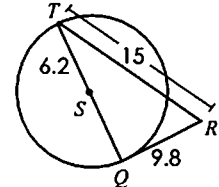
B.



C.



D.



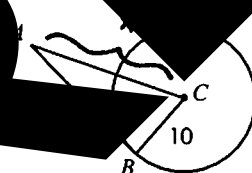
For questions 12-15, find each measure. Assume that all segments that appear to be tangent are tangent.

12. $AC = 37$

$x^2 = 12$

$x^2 = 541$

$x = 3$



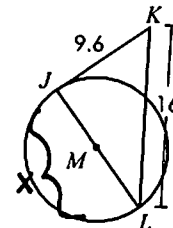
13. $ML = 6.4$

$x^2 + 9.6^2 = 16^2$

$x^2 = 163.84$

$x = 12.8$

$ML = \frac{1}{2}(12.8) = 6.4$

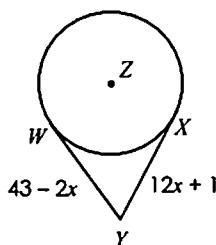


14. 37

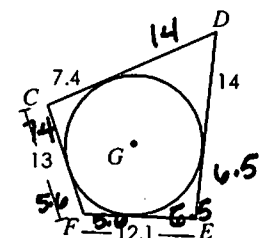
$43 - 2x = 12x + 1$

$42 = 14x$

$x = 3$



15. Perimeter of CDEF = 67



$WY = 43 - 2(3) = 37$

So... how's your **ALGEBRA GAME?**

Many topics in this unit will require some of those sweet algebra skills. Need a refresher? Try these!

SET 1 Multi-Step Equations

Solve for x .

1. $8(x - 5) = 2(3x - 8)$

$$8x - 40 = 6x - 16$$

$$2x - 40 = -16$$

$$2x = 24$$

$$\boxed{x = 12}$$

2. $167 - (7x + 3) = 108$

$$167 - 7x - 3 = 108$$

$$-7x + 164 = 108$$

$$-7x = -56$$

$$\boxed{x = 8}$$

3. $\frac{3x + 15 + (11x - 5)}{2} = 47$

$$\frac{14x + 10}{2} = 47$$

$$14x + 10 = 94$$

$$14x = 84$$

$$\boxed{x = 6}$$

4. $\frac{7}{2} = \frac{8x - 1}{3x - 14}$

$$21 = 5x - 8$$

$$4x = -33$$

$$-11 = x - 33$$

$$\boxed{11 = x}$$

SET 2 Multiplying Binomials/FOIL

Find each product.

5. $(x + 8)(x - 1)$

$$x^2 - x - 8$$

$$\boxed{x^2 - x - 8}$$

6. $(3x - 5)(x + 6)$

$$3x^2 + 18x - 5x - 30$$

$$\boxed{3x^2 + 13x - 30}$$

7. $(5x - 1)(2x^2 - 4x + 14)$

$$10x^2 - 39x + 14$$

$$\boxed{10x^2 - 39x + 14}$$

8. $(2x + 1)(2x - 1)$

$$4x^2 - 2x + 2x - 1$$

$$\boxed{4x^2 - 1}$$

9. $(x + 9)(x + 9)$

$$x^2 + 9x + 9x + 81$$

$$\boxed{x^2 + 18x + 81}$$

10. $(4x + 3)^2 \rightarrow (4x + 3)(4x + 3)$

$$16x^2 + 12x + 12x + 9$$

$$\boxed{16x^2 + 24x + 9}$$

SET 3 Factoring Polynomials

Factor each polynomial.

11. $x^2 + 10x + 21$

$$(x+7)(x+3)$$

12. $x^2 + 16x - 36$

$$(x+18)(x-2)$$

13. $x^2 - 28x + 96$

$$(x-24)(x-4)$$

14. $x^2 - 6x - 247$

$$(x-19)(x+13)$$

15. $x^2 - 64$

$$(x+8)(x-8)$$

16. $9x^2 - 1$

$$(3x+1)(3x-1)$$

17. $4x^2 + 4x - 80$

$$4(x^2 + x - 20)$$

$$4(x+5)(x-4)$$

18. $2x^2 - x - 15$

$$(2x+5)(x-3)$$

SET 4 Quadratic Equations

Solve for x.

19. $x^2 - 9x + 20 = 0$

$$(x-4)(x-5) = 0$$

$$x=4 \quad x=5$$

$$x = \{4, 5\}$$

20. $x^2 + 6x = 135$

$$x^2 + 6x - 135 = 0$$

$$(x+15)(x-9) = 0$$

$$x = -15 \quad x = 9$$

$$x = \{-15, 9\}$$

21. $x^2 - 12x + 24 = 0$

$$x^2 - 12x + 24 = 0$$

$$(x-2)(x-12) = 0$$

$$x=2 \quad x=12$$

$$x = \{2, 12\}$$

22. $x^2 = 12x - 36$

$$x^2 - 12x + 36 = 0$$

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

$$x=6 \quad x=6$$

$$x = \{6\}$$

23. $(x-1)(x-4) = 6$

$$x^2 - 5x + 4 = 6$$

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

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

$$x=5 \quad x=-2$$

$$x = \{5, -2\}$$

24. $2x^2 = 3x + 9$

$$2x^2 - 3x - 9 = 0$$

$$x^2 - 3x - 18 = 0$$

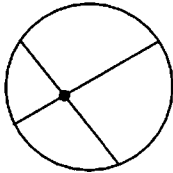
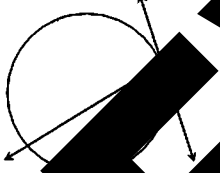
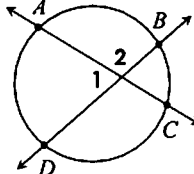
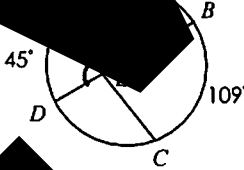
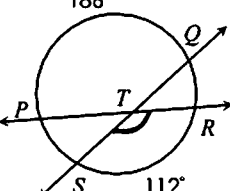
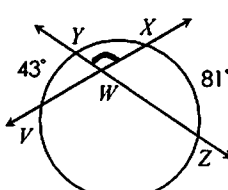
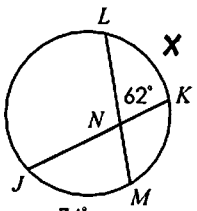
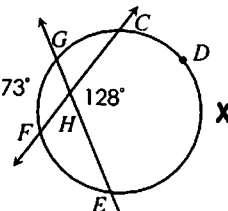
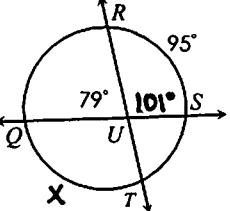
$$(x-6)(x+3) = 0$$

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

$$x=3 \quad x=-3/2$$

$$x = \{-3/2, 3\}$$

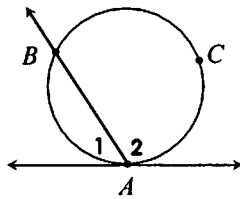
Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
ARCS & ANGLES formed by Intersecting Chords, Secants, & Tangents	When chords, secants, and tangents intersect in a circle (Figure 1), on a circle (Figure 2), or outside of a circle (Figure 3), special relationships exist between the angle and arc measures for each situation. Figure 1 (inside the circle)  Figure 2 (on the circle)  Figure 3 (outside the circle) 
INTERIOR Intersections	If two secants or chords intersect inside a circle, then the measure of the angle formed is equal to half the sum of the measures of the two intercepted arcs.  $m\angle 1 = \frac{1}{2}(m\widehat{AB} + m\widehat{CD})$ Find each angle. 1. $m\angle FED$ $\frac{1}{2}(45 + 109)$ $\frac{1}{2}(154)$ $= 77^\circ$  2. $m\angle STR$ $\frac{1}{2}(186 + 112)$ $\frac{1}{2}(298)$ $= 149^\circ$  3. $m\angle YWX$ $\frac{1}{2}(43 + 81)$ $\frac{1}{2}(124)$ $= 62^\circ$  4. $m\widehat{LK}$ $62 = \frac{1}{2}(x + 74)$ $124 = x + 74$ $x = 50^\circ$  5. $m\widehat{CDE}$ $128 = \frac{1}{2}(73 + x)$ $256 = 73 + x$ $183^\circ = x$  6. $m\widehat{QT}$ $101 = \frac{1}{2}(x + 95)$ $202 = x + 95$ $x = 107^\circ$ 

ON THE CIRCLE

Intersections

If a secant and a tangent intersect at the point of tangency, then the measure of each angle formed is equal to **half the measure of its intercepted arc**.



$$m\angle 1 = \frac{1}{2} (m \widehat{AB})$$

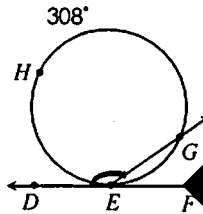
$$m\angle 2 = \frac{1}{2} (m \widehat{ACB})$$

Find each measure.

7. $m\angle DEG$

$$\frac{1}{2}(308)$$

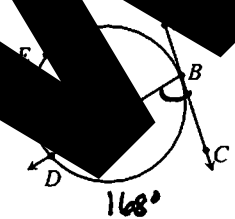
$$= 154^\circ$$



8. $m\angle DFB$

$$\frac{1}{2}(168)$$

$$= 84^\circ$$

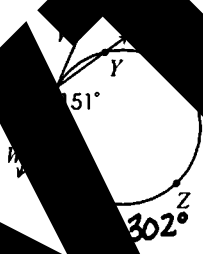


9. $m\widehat{XY}$

$$m\widehat{XZ} = 2(151)$$

$$= 302^\circ$$

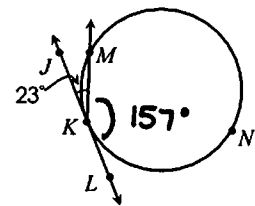
$$m\widehat{XY} = 302^\circ$$



10. $m\angle KLM$

$$\frac{1}{2}(314)$$

$$= 157^\circ$$



EXTERIOR

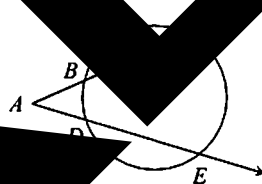
Intersections

If two secants or two tangents intersect on the exterior of a circle, then the measure of the angle formed is equal to **half the difference of the intercepted arcs**.

SECANTS

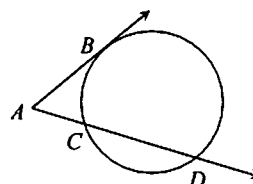
SECANT & TANGENT

TWO TANGENTS



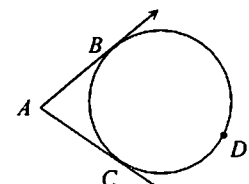
$$m\angle A =$$

$$\frac{1}{2}(m \widehat{CE} - m \widehat{BD})$$



$$m\angle A =$$

$$\frac{1}{2}(m \widehat{BD} - m \widehat{BC})$$



$$m\angle A =$$

$$\frac{1}{2}(m \widehat{BDC} - m \widehat{BEC})$$

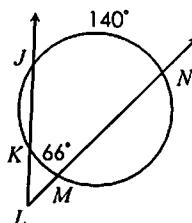
Find each measure.

11. $m\angle KLM$

$$\frac{1}{2}(140 - 66)$$

$$\frac{1}{2}(74)$$

$$= 37^\circ$$

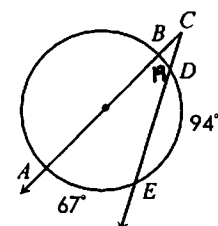


12. $m\angle BCD$

$$\frac{1}{2}(67 - 19)$$

$$\frac{1}{2}(48)$$

$$= 24^\circ$$

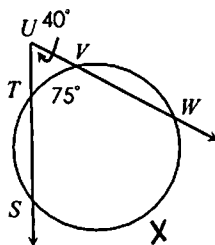


13. $m\widehat{SW}$

$$40 = \frac{1}{2}(x - 75)$$

$$80 = x - 75$$

$$x = 155^\circ$$

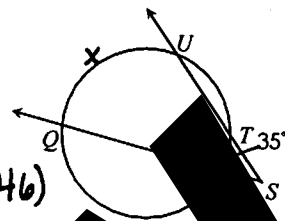


14. $m\widehat{QU}$

$$35 = \frac{1}{2}(x - 46)$$

$$70 = x - 46$$

$$116 = x$$

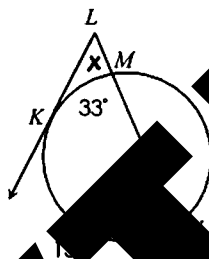


15. $m\angle KLM$

$$\frac{1}{2}(135 - 33)$$

$$\frac{1}{2}(102)$$

$$= 51^\circ$$

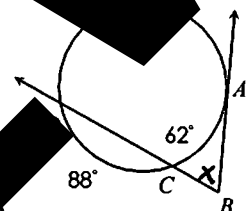


16. $m\angle ABC$

$$\frac{1}{2}(212 - 88)$$

$$\frac{1}{2}(124)$$

$$= 62^\circ$$

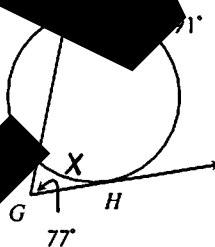


17. $m\widehat{GH}$

$$\frac{1}{2}(160 - 77)$$

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

$$= 41.5^\circ$$

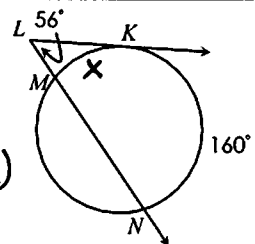


18. $m\widehat{MK}$

$$56 = \frac{1}{2}(160 - x)$$

$$112 = 160 - x$$

$$x = 48^\circ$$

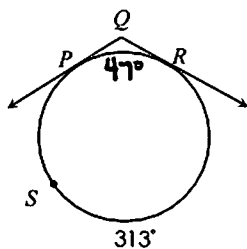


19. $m\angle PQR$

$$\frac{1}{2}(313 - 47)$$

$$\frac{1}{2}(266)$$

$$= 133^\circ$$

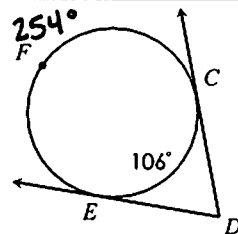


20. $m\angle CDE$

$$\frac{1}{2}(254 - 106)$$

$$\frac{1}{2}(148)$$

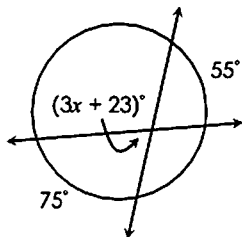
$$= 74^\circ$$



ARCS, ANGLES, & Algebra

Note: Assume that all segments that appear to be tangent are tangent.

1. Solve for x .



$$3x + 23 = \frac{1}{2}(75 + 55)$$

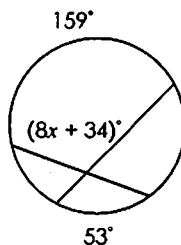
$$3x + 23 = \frac{1}{2}(130)$$

$$3x + 23 = 65$$

$$3x = 42$$

$$x = 14$$

2. Solve for x .



$$8x + 34 = \frac{1}{2}(159 + 53)$$

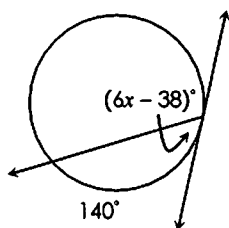
$$8x + 34 = \frac{1}{2}(212)$$

$$8x + 34 = 106$$

$$8x = 72$$

$$x = 9$$

3. Solve for x .



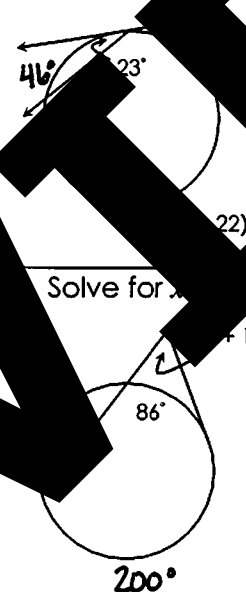
$$6x - 38 = \frac{1}{2}(140 + 70)$$

$$6x - 38 = 70$$

$$6x = 108$$

$$x = 18$$

4. Solve for x .



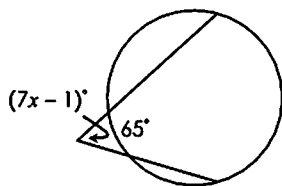
$$2x + 23 = \frac{1}{2}(46 + 22)$$

$$2x + 23 = 34$$

$$2x = 11$$

$$x = 24$$

5. Solve for x .



$$7x - 1 = \frac{1}{2}(161 + 65)$$

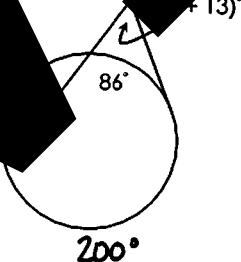
$$7x - 1 = 113$$

$$7x = 114$$

$$7x = 114$$

$$x = 16$$

Solve for x .



$$4x + 13 = \frac{1}{2}(200 + 86)$$

$$4x + 13 = \frac{1}{2}(286)$$

$$4x + 13 = 143$$

$$4x = 130$$

$$x = 32.5$$

7. If $m\widehat{CB} = (5x + 41)^\circ$, $m\widehat{AD} = (7x - 19)^\circ$, and $m\angle AED = 89^\circ$, find $m\widehat{AD}$.

$$89 = \frac{1}{2}(5x + 41 + 7x - 19)$$

$$89 = \frac{1}{2}(12x + 22)$$

$$89 = 6x + 11$$

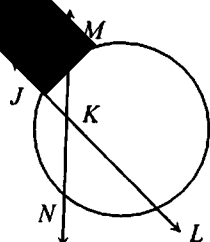
$$78 = 6x$$

$$x = 13$$

$$m\widehat{AD} = 7(13) - 19$$

$$= 72^\circ$$

If $m\widehat{JM} = (10x + 9)^\circ$, $m\widehat{NL} = (28x + 17)^\circ$, and $m\angle NKL = (16x + 19)^\circ$, find $m\angle NKL$.



$$16x + 19 = \frac{1}{2}(10x + 9 + 28x + 17)$$

$$16x + 19 = \frac{1}{2}(38x + 26)$$

$$16x + 19 = 19x + 13$$

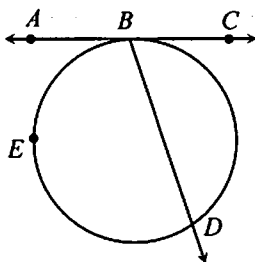
$$6 = 3x$$

$$x = 2$$

$$m\angle NKL =$$

$$16(2) + 19 = 51^\circ$$

9. If $m\widehat{BED} = (15x - 47)^\circ$ and $m\widehat{BD} = (9x - 1)^\circ$, find $m\angle CBD$.



$$15x - 47 + 9x - 1 = 360$$

$$24x - 48 = 360$$

$$24x = 408$$

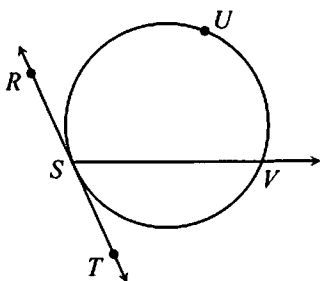
$$x = 17$$

$$m\widehat{BD} = 9(17) - 1$$

$$= 152$$

$$m\angle CBD = 152^\circ$$

10. If $m\angle TSV = (6x + 17)^\circ$ and $m\widehat{SV} = (15x + 13)^\circ$, find $m\widehat{SUV}$.



$$2(6x + 17) = 15x + 13$$

$$12x + 34 = 15x + 13$$

$$21 = 3x$$

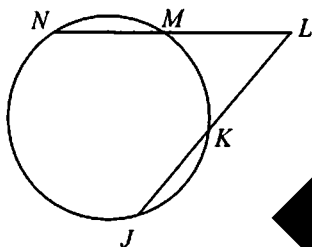
$$x = 7$$

$$m\widehat{SV} = 15(7) + 13$$

$$= 118$$

$$m\widehat{SUV} = 242^\circ$$

11. If $m\widehat{NJ} = 170^\circ$, $m\widehat{MK} = (5x + 8)^\circ$, and $m\angle MLK = (4x + 3)^\circ$, find $m\angle MLK$.



$$4x + 3 = \frac{1}{2}(170 - (5x + 8))$$

$$4x + 3 = \frac{1}{2}(162 - 5x)$$

$$8x + 6 = 162 - 5x$$

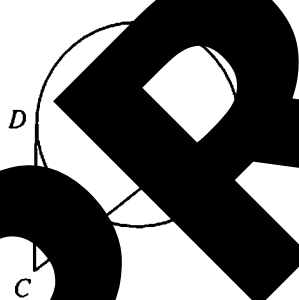
$$13x = 156$$

$$x = 12$$

$$m\angle MLK = 4(12) + 3$$

$$= 51^\circ$$

12. If $m\widehat{DA} = (23x - 14)^\circ$, $m\widehat{DC} = (9x - 4)^\circ$, and $m\angle DCB = (5x + 11)^\circ$, find $m\widehat{DA}$.



$$\frac{1}{2}(23x - 14 - (9x - 4))$$

$$5x + 11 = \frac{1}{2}(14x - 10)$$

$$10x + 22 = 14x - 10$$

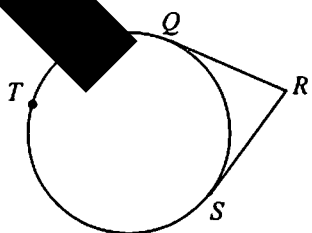
$$32 = 4x$$

$$x = 8$$

$$m\widehat{DA} = 23(8) - 14$$

$$= 170^\circ$$

13. If $m\widehat{TS} = (16x + 23)^\circ$, $m\widehat{QS} = (7x + 15)^\circ$, and $m\angle QRS = (5x - 3)^\circ$, find $m\widehat{QTS}$.



$$5x - 3 = \frac{1}{2}(16x + 23 - (7x + 15))$$

$$10x - 6 = 9x + 8$$

$$x = 14$$

$$m\widehat{QTS} = 16(14) + 23$$

$$= 247^\circ$$

Name: _____

Unit 10: Circles

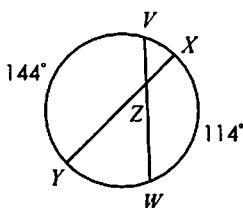
Date: _____ Per: _____

Homework 7: Arc & Angle Measures formed
by Chords, Secants, & Tangents**** This is a 2-page document! ******Directions:** Find each value or measure. Assume that all segments that appear to be tangent are tangent.1. $m\angle YZV$

$$\frac{1}{2}(144 + 114)$$

$$\frac{1}{2}(258)$$

$$= 129^\circ$$

2. $m\widehat{AD}$

$$93 = \frac{1}{2}(161 + x)$$

$$186 = 161 + x$$

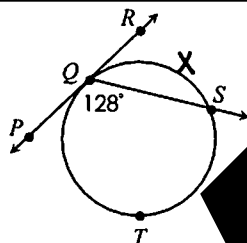
$$x = 25^\circ$$

3. $m\widehat{QS}$

$$m\widehat{QTS} = 2(128)$$

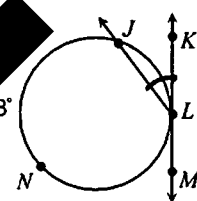
$$= 256^\circ$$

$$m\widehat{QS} = 104^\circ$$

4. $m\angle JLK$

$$m\angle JLK = 62^\circ$$

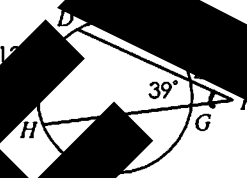
$$m\angle JLK = \frac{1}{2}(124)$$

5. $m\angle EFG$

$$\frac{1}{2}(121 - 39)$$

$$\frac{1}{2}(82)$$

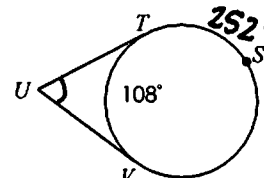
$$= 41^\circ$$

6. $m\angle TUV$

$$252 - 108$$

$$2(144)$$

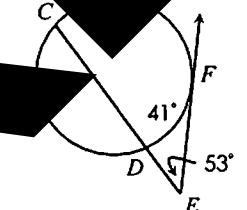
$$= 72^\circ$$

7. $m\widehat{CF}$

$$53 = \frac{1}{2}(x - 41)$$

$$106 = x - 41$$

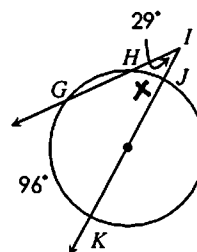
$$x = 147$$

8. $m\widehat{HJ}$

$$29 = \frac{1}{2}(96 - x)$$

$$58 = 96 - x$$

$$x = 38^\circ$$



9. Solve for x.

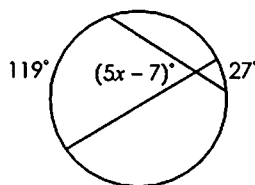
$$5x = \frac{1}{2}(119 + 21)$$

$$5x = \frac{1}{2}(140)$$

$$5x - 7 = 73$$

$$5x = 80$$

$$x = 16$$

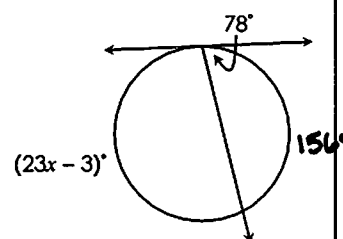


10. Solve for x.

$$23x - 3 = 204$$

$$23x = 207$$

$$x = 9$$



11. Solve for x .

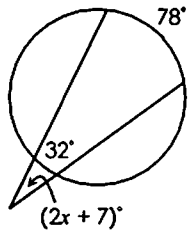
$$2x+7 = \frac{1}{2}(78-32)$$

$$2x+7 = \frac{1}{2}(46)$$

$$2x+7 = 23$$

$$2x = 16$$

$$\boxed{x=8}$$



12. Solve for x .

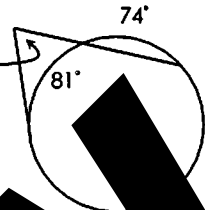
$$17x-23 = \frac{1}{2}(205-81) \quad (17x-23)^\circ$$

$$17x-23 = \frac{1}{2}(124)$$

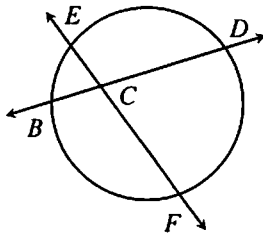
$$17x-23 = 62$$

$$17x = 85$$

$$\boxed{x=5}$$



13. If $m\widehat{ED} = (9x-3)^\circ$, $m\widehat{BF} = (15x-39)^\circ$, and $m\angle BCF = (11x-9)^\circ$, find $m\widehat{ED}$.



$$11x-9 = \frac{1}{2}(9x-3 + 15x-39)$$

$$11x-9 = \frac{1}{2}(24x-42)$$

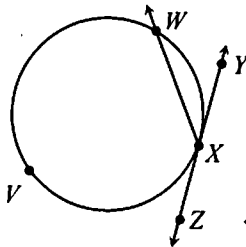
$$22x-18 = 24x-42$$

$$24 = 2x$$

$$x=12$$

$$m\widehat{ED} = 9(12)-3 = \boxed{105^\circ}$$

14. If $m\widehat{WX} = (13x+9)^\circ$ and $m\angle WXZ = (5x+36)^\circ$, find $m\angle WXY$.



$$2(5x+36) = 13x+9$$

$$10x+72 = 13x+9$$

$$x=21$$

$$m\angle WXY = 5(21)+36 = 141^\circ$$

$$m\angle WXY = \boxed{39^\circ}$$

15. If $m\widehat{QT} = (27x+3)^\circ$, $m\widehat{RT} = (9x-5)^\circ$, and $m\angle RST = (10x-2)^\circ$, find $m\widehat{RT}$.

$$10x-2 = \frac{1}{2}(27x+3 - (9x-5))$$

$$10x-2 = \frac{1}{2}(18x+8)$$

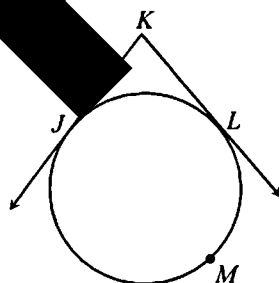
$$20x-4 = 18x+8$$

$$2x = 12$$

$$x=6$$

$$m\widehat{RT} = 9(6)-5 = \boxed{49^\circ}$$

16. If $m\widehat{JKL} = (8x-6)^\circ$ and $m\widehat{JML} = (25x-13)^\circ$, find $m\widehat{JML}$.



$$8x-6 = \frac{1}{2}(25x-13 - [360-(25x-13)])$$

$$16x-12 = (25x-13 - [360-25x+13])$$

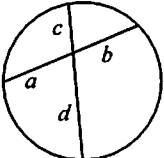
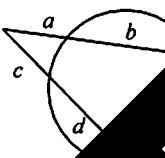
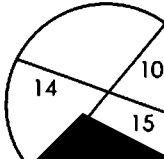
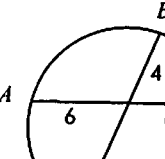
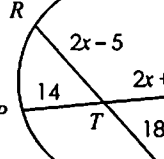
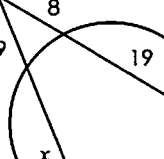
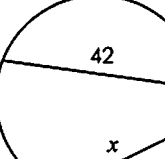
$$16x-12 = 50x-386$$

$$374 = 34x$$

$$x=11$$

$$m\widehat{JML} = 25(11)-13 = \boxed{262^\circ}$$

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples		
SEGMENT LENGTHS Formed by Intersecting Chords, Secants, & Tangents	TYPE 1	TYPE 2	TYPE 3
	Intersecting chords (or secants) inside the circle. 	Intersecting secants outside the circle. 	A secant and a tangent from an external point. 
	$a \cdot b = c \cdot d$	$a(a+b) = c(c+d)$	$a^2 = b(b+c)$
Find each value or measure. Assume all segments that appear to be tangent are tangent.			
1. Solve for x. $10 \cdot x = 14 \cdot 15$ $10x = 210$ $x = 21$		2. Find x. $6 \cdot 6 = (x-4)(x-4)$ $36 = x^2 - 8x + 16$ $20 = x^2 - 8x$ $0 = x^2 - 8x - 20$ $0 = (x-10)(x+2)$ $x = 10$	
3. Solve for x. $27(x+5) = 14(2x+7)$ $27x + 135 = 28x + 98$ $-x = -37$ $x = 37$		4. Find TQ. $18(2x-5) = 14(2x+1)$ $36x - 90 = 28x + 14$ $8x = 104$ $x = 13$	
5. Find x. $9(x+13) = 8(27)$ $9x + 117 = 216$ $9x = 99$ $x = 11$		6. Find NL. $13(x+13) = 10(52)$ $13x + 169 = 520$ $13x = 351$ $x = 27$	
		$NL = 40$	

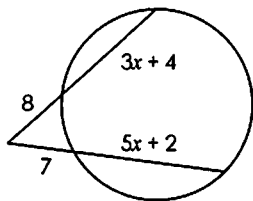
7. Solve for x.

$$8(3x+12) = 7(5x+9)$$

$$24x + 96 = 35x + 63$$

$$33 = 11x$$

$$x = 3$$



8. Find YZ.

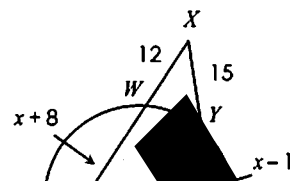
$$12(x+20) = 15(x+14)$$

$$12x + 240 = 15x + 210$$

$$30 = 3x$$

$$x = 10$$

$$YZ = 9$$



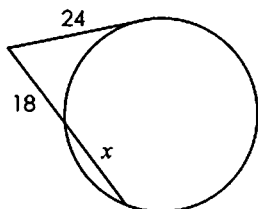
9. Solve for x.

$$24^2 = 18(x+18)$$

$$576 = 18x + 324$$

$$252 = 18x$$

$$x = 14$$



10. Find PN.

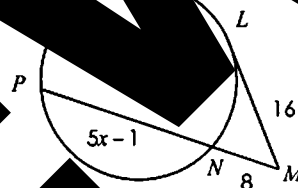
$$8(5x+7) = 11(8)$$

$$40x + 56 = 88$$

$$40x = 32$$

$$x = 0.8$$

$$PN = 24$$



11. Solve for x.

$$x^2 = 27(48)$$

$$x^2 = 1296$$

$$x = 36$$



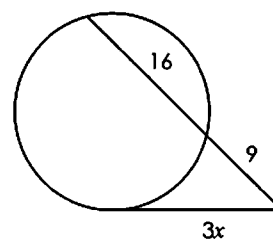
12. Solve for x.

$$(3x)^2 = 225$$

$$9x^2 = 225$$

$$x^2 = 25$$

$$x = 5$$



13. Solve for x.

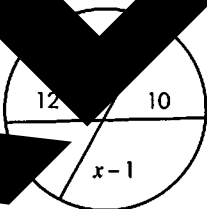
$$(x-1)(x+6) = 120$$

$$x^2 + 5x - 6 = 120$$

$$x^2 + 5x - 126 = 0$$

$$(x+14)(x-9) = 0$$

$$x = -14 \text{ or } x = 9$$



14. Solve for x.

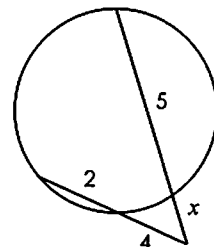
$$x(x+5) = 4(6)$$

$$x^2 + 5x = 24$$

$$x^2 + 5x - 24 = 0$$

$$(x+8)(x-3) = 0$$

$$x = -8 \text{ or } x = 3$$



15. Solve for x.

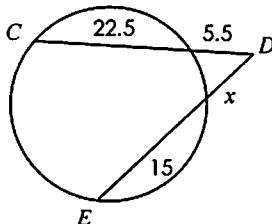
$$x(x+5) = 5.5(28)$$

$$x^2 + 5x = 154$$

$$x^2 + 5x - 154 = 0$$

$$(x+22)(x-7) = 0$$

$$x = -22 \text{ or } x = 7$$



16. Solve for x.

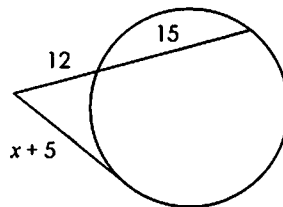
$$(x+5)^2 = 12(27)$$

$$x^2 + 10x + 25 = 324$$

$$x^2 + 10x - 299 = 0$$

$$(x+23)(x-13) = 0$$

$$x = -23 \text{ or } x = 13$$



Name: _____

Unit 10: Circles

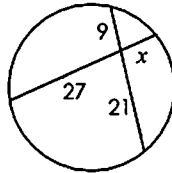
Date: _____ Per: _____

Homework 8: Segments Lengths formed by
Chords, Secants, and Tangents**** This is a 2-page document! ******Directions:** Find each value or measure. Assume all segments that appear to be tangent are tangent.1. Solve for x .

$$27 \cdot x = 9 \cdot 21$$

$$27x = 189$$

$$x = 7$$

2. Find FD .

$$12(3x - 5) = 15 \cdot 9$$

$$36x - 60 = 135$$

$$36x = 195$$

$$x = 5.4167$$

$$FD = 22$$

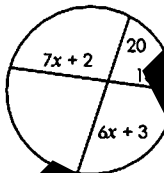
3. Solve for x .

$$18(7x + 2) = 20(6x + 3)$$

$$126x + 36 = 120x + 60$$

$$6x = 24$$

$$x = 4$$

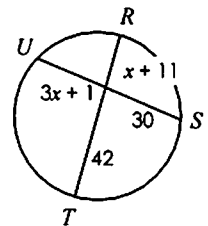


$$42(x + 1) = 30(3x + 1)$$

$$42x + 42 = 90x + 30$$

$$42 = 48x$$

$$x = 9$$



$$US = 58$$

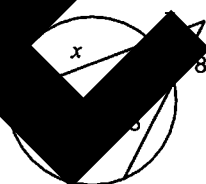
5. Solve for x .

$$7(x + 7) = 8(7)$$

$$7x + 49 = 56$$

$$7x = 7$$

$$x = 1$$

6. Find MN .

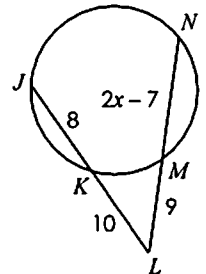
$$10(18) = 9(2x + 2)$$

$$180 = 18x + 18$$

$$162 = 18x$$

$$x = 9$$

$$MN = 11$$

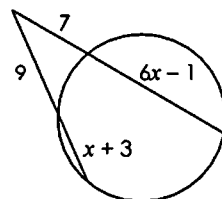
Solve for x .

$$12 = 7(6x + 6)$$

$$12 = 42x + 42$$

$$66 = 33x$$

$$x = 2$$

8. Find YZ .

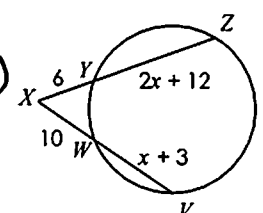
$$6(2x + 18) = 10(x + 13)$$

$$12x + 108 = 10x + 130$$

$$2x = 22$$

$$x = 11$$

$$YZ = 34$$



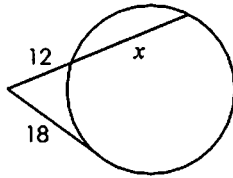
9. Solve for x.

$$18^2 = 12(x+12)$$

$$324 = 12x + 144$$

$$180 = 12x$$

$$\boxed{x = 15}$$



10. Find AC.

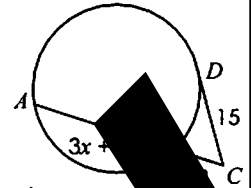
$$9(3x+10) = 15^2$$

$$27x + 90 = 225$$

$$27x = 135$$

$$x = 5$$

$$\boxed{AC = 25}$$

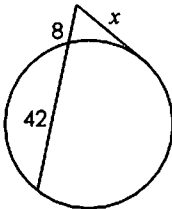


11. Solve for x.

$$x^2 = 8(50)$$

$$x^2 = 400$$

$$\boxed{x = 20}$$



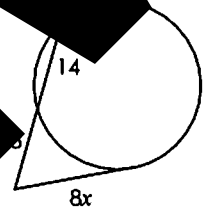
12. Solve for x.

$$(8x)^2 = 14^2$$

$$64x^2 = 196$$

$$x^2 = 3.0625$$

$$x = 1.76$$



13. Solve for x.

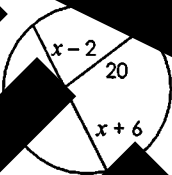
$$9(20) = (x-2)(x+6)$$

$$180 = x^2 + 4x - 12$$

$$0 = x^2 + 4x - 192$$

$$0 = (x+24)(x-8)$$

$$\boxed{x = 8}$$



14. Solve for x.

$$216 = (x+4)(4x+4)$$

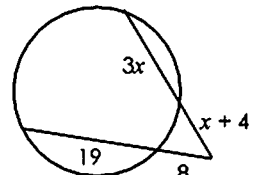
$$216 = 4x^2 + 20x + 16$$

$$0 = 4x^2 + 20x - 200$$

$$0 = 4(x^2 + 5x - 50)$$

$$0 = 4(x+10)(x-5)$$

$$\boxed{x = 5}$$



15. Solve for x.

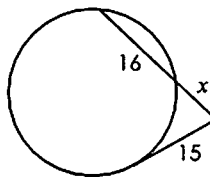
$$15^2 = x(x+16)$$

$$225 = x^2 + 16x$$

$$0 = x^2 + 16x - 225$$

$$0 = (x+25)(x-9)$$

$$\boxed{x = 9}$$



16. Solve for x.

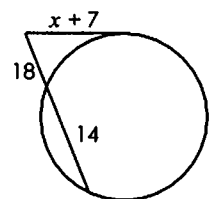
$$(x+7)^2 = 18(32)$$

$$x^2 + 14x + 49 = 576$$

$$x^2 + 14x - 527 = 0$$

$$(x+31)(x-17) = 0$$

$$\boxed{x = 17}$$



Name: _____

Geometry

Date: _____ Per: _____

Unit 10: Circles

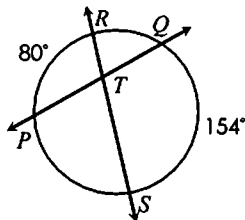
Quiz 10-3: Angles, Arcs, and Segment Lengths
formed by Intersecting Chords, Secants, and Tangents

Find each value or measure. Assume all lines that appear to be tangent are tangent.

1. $m\angle QTS = 117^\circ$

$$\frac{1}{2} (154 + 80)$$

$$\frac{1}{2} (234)$$



2. $m\widehat{JH} = 34^\circ$

$$55 = \frac{1}{2} (76 +$$

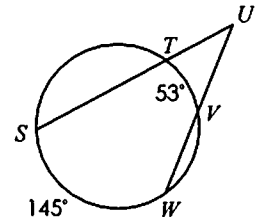
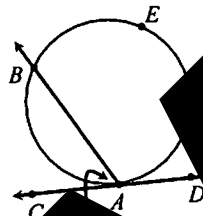
$$110 = 76 + x$$

$$34 = x$$



3. $m\widehat{BEA} = 212^\circ$

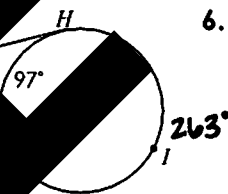
$$m\widehat{BA} = 148^\circ$$



5. $m\angle FGH = 83^\circ$

$$\frac{1}{2} (263 - 97)$$

$$\frac{1}{2} (166)$$

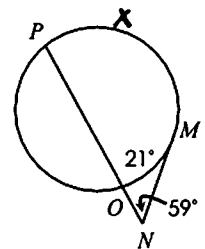


6. $m\widehat{PM} = 139^\circ$

$$59 = \frac{1}{2} (x - 21)$$

$$118 = x - 21$$

$$x = 139$$



$$x = 16$$

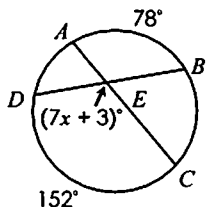
$$152 = \frac{1}{2} (152 + 78)$$

$$7x + 3 = \frac{1}{2} (230)$$

$$7x + 3 = 115$$

$$7x = 112$$

$$x = 16$$



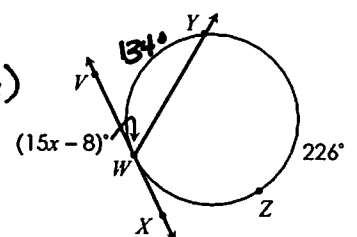
8. $x = 5$

$$15x - 8 = \frac{1}{2} (134)$$

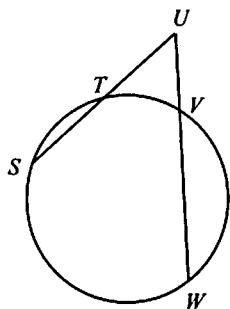
$$15x - 8 = 67$$

$$15x = 75$$

$$x = 5$$



9. If $m\widehat{SW} = (12x - 5)^\circ$, $m\widehat{TV} = (2x + 7)^\circ$, and $m\angle TUV = (6x - 19)^\circ$, find $m\widehat{SW}$.



$$6x - 19 = \frac{1}{2} (12x - 5 - (2x + 7))$$

$$12x - 38 = 12x - 5 - 2x - 7$$

$$12x - 38 = 10x - 12$$

$$2x = 26$$

$$x = 13$$

9. $m\widehat{SW} = \underline{151^\circ}$

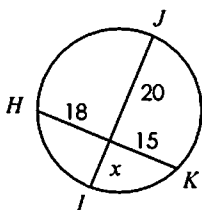
$$m\widehat{SW} = 12(13) - 5 = 151^\circ$$

10. $x = \underline{13.5}$

$$18(15) = x(20)$$

$$270 = 20x$$

$$x = 13.5$$



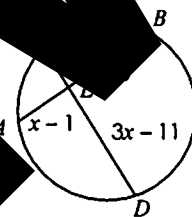
11. $CD = \underline{5}$

$$12(3x - 1) = 30(1)$$

$$36x - 12 = 30$$

$$6x = 42$$

$$x = 7$$

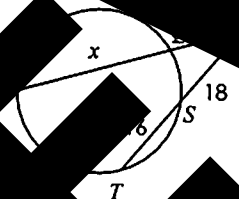


12. $PQ = \underline{39}$

$$12(12 + x) = 18(34)$$

$$144 + 12x = 612$$

$$12x = 468$$



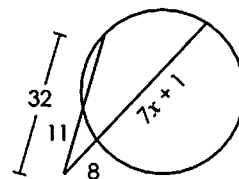
13. $x = \underline{5}$

$$32 = 8(7x + 9)$$

$$32 = 56x + 72$$

$$280 = 56x$$

$$x = 5$$



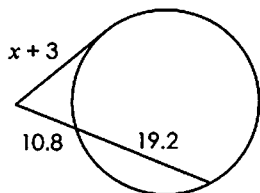
14. $(x + 21)(x - 15) = 0$

$$x + 21 = 0$$

$$x - 15 = 0$$

$$(x + 21)(x - 15) = 0$$

$$x = -21 \quad x = 15$$



15. $JK = \underline{18}$

$$(x - 1)(2x + 10) = 12^2$$

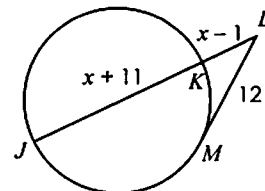
$$2x^2 + 8x - 10 = 144$$

$$2x^2 + 8x - 154 = 0$$

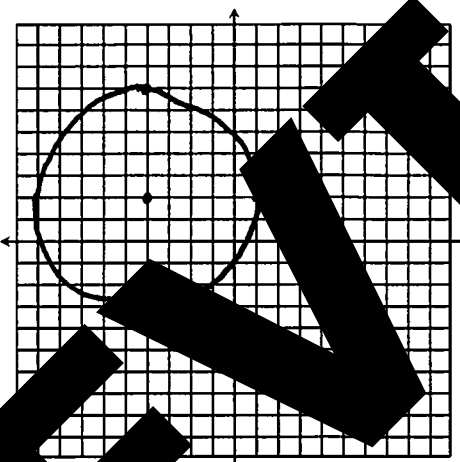
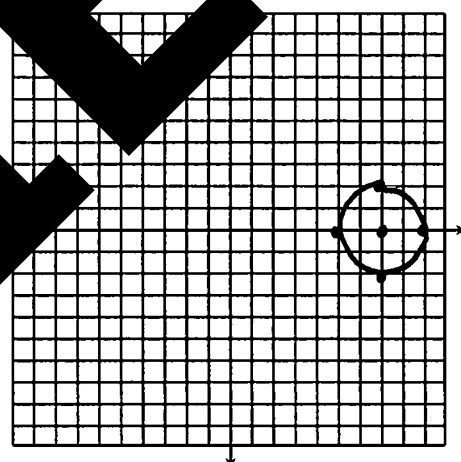
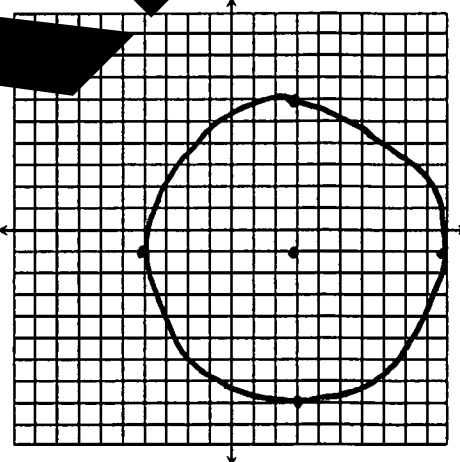
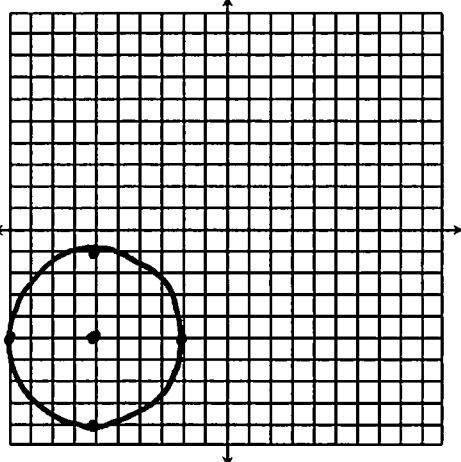
$$2(x^2 + 4x - 77) = 0$$

$$2(x + 11)(x - 7) = 0$$

$$x = -11 \quad x = 7$$



Name:		Date:	
Topic:		Class:	

Main Ideas/Questions	Notes/Examples	
STANDARD FORM EQUATION <i>of a circle</i>	The standard form for the equation of a circle in the coordinate plane is given as $(x-h)^2 + (y-k)^2 = r^2$ where <u>(h,k)</u> is the <u>center</u> and <u>r</u> is the <u>radius</u> .	
	Graph each circle and identify its center and radius.	
	1. $(x+4)^2 + (y-2)^2 = 25$	
		
	Center: (-4, 2) Radius: 5	Center: (7, 0) Radius: 2
	2. $x^2 + y^2 = 4$	
	3. $(x-3)^2 + (y+1)^2 = 49$	
	4. $(x+6)^2 + (y+5)^2 = 16$	
		
	Center: (3, -1) Radius: 7	Center: (-6, -5) Radius: 4

Identify each part of the circle given its equation.

5. $(x-5)^2 + (y-1)^2 = 64$

Center: (5, 1)

Radius: 8

6. $(x+7)^2 + (y-2)^2 = 324$

Center: (-7, 2)

$r = 18$ Diameter: 36

7. $x^2 + (y+10)^2 = 42.25$

Center: (0, -10)

$r = 6.5$ Diameter: 13

8. $(x-6)^2 + (y+1)^2 = 80$

Center: (6, -1)

$r = \sqrt{80}$ Radius: $4\sqrt{5}$

9. $(x+2)^2 + (y+9)^2 = 196$

$r = 14$

$C = 2\pi(14)$

Center: (-2, -9)

Circumference: 28π ; 88

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

$4\sqrt{2}$

Center: (3, 0)

Circumference: $8\pi\sqrt{2}$; 35.5

11. $(x-3)^2 + (y+4)^2 = 81$

$r = 9$

$A = \pi(9)^2$

Center: (3, -4)

Area: 81π ; 254.16

12. $(x+7)^2 + (y-2)^2 = 108$

$r = 6\sqrt{3}$

$(\sqrt{3})^2$

Center: (-7, 2)

Area: 108π ; 339.3

GENERAL FORM EQUATION

of a circle

The general form for the equation of a circle in the coordinate plane is given as:

$$Ax^2 + Bx + Cy^2 + Dy + E = 0$$

How do we write general form equations to standard form equations using a process called **completing the square**. Converting to standard form is useful when determining the center and radius of the circle.

Use the steps below to convert the given equation to standard form. Then identify the radius and center of the circle.

Converting to
STANDARD FORM

Steps

Given: $x^2 + y^2 - 2x + 6y - 6 = 0$

① Group the x-terms together and the y-terms together. Move the constant to the right side of the equation.

$$x^2 - 2x + y^2 + 6y = 6$$

② Take half of the linear x-term and square it. Add this value to both sides of the equation.

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

③ Take half of the linear y-term and square it. Add this value to both sides of the equation.

$$x^2 - 2x + 1 + y^2 + 6y + 9 = 7 + 9$$

④ You have created two perfect square trinomials. Rewrite them in factored form as squared binomials.

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

⑤ Identify the center and radius of the circle.

Center: (1, -3)

radius: 4

EXAMPLES

Write each equation in standard form. Then identify the indicated parts.

13. $x^2 + y^2 + 14x - 4y + 17 = 0$; center and radius

$$x^2 + 14x + y^2 - 4y = -17$$

$$x^2 + 14x + \underline{49} + y^2 - 4y + \underline{4} = -17 + \underline{49} + \underline{4}$$

$$(x+7)^2 + (y-2)^2 = 36$$

Center: $(-7, 2)$; radius: 6

14. $x^2 + y^2 + 4x + 8y - 55 = 0$; center and radius

$$x^2 + 4x + y^2 + 8y = 55$$

$$x^2 + 4x + \underline{4} + y^2 + 8y + \underline{16} = 55 + \underline{4} + \underline{16}$$

$$(x+2)^2 + (y+4)^2 = 75$$

Center: $(-2, -4)$; radius: $5\sqrt{3}$

15. $x^2 + y^2 - 12y - 85 = 0$; center and diameter

$$x^2 + y^2 - 12y = 85$$

$$x^2 + y^2 - 12y + \underline{36} = 85 + \underline{36}$$

$$x^2 + (y-6)^2 = 121$$

Center: $(0, 6)$; diameter: 22

16. $x^2 + y^2 - 18x - 2y = 62$; center and diameter

$$x^2 - 18x + y^2 - 2y = 62$$

$$x^2 - 18x + \underline{81} + y^2 - 2y + \underline{1} = 62 + \underline{81} + \underline{1}$$

$$(x-9)^2 + (y-1)^2 = 120$$

Center: $(9, 1)$; diameter: $4\sqrt{30}$

17. $x^2 + y^2 - 2x + 20 = 2x - 10y$; center and circumference

$$x^2 + y^2 - 4x + 10y + 20 = 0$$

$$x^2 - 4x + \underline{4} + y^2 + 10y + \underline{25} = -20 + \underline{4} + \underline{25}$$

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

Center: $(2, -5)$; circumference: 6π (18.8)

18. $x^2 + 10x + 16y + 5 = 4x - y^2$; center and area

$$x^2 + y^2 + 6x + 16y + 5 = 0$$

$$x^2 + 6x + \underline{9} + y^2 + 16y + \underline{64} = -5 + \underline{9} + \underline{64}$$

$$(x+3)^2 + (y+8)^2 = 68$$

Center: $(-3, -8)$; area: 68π (213.6)

Name: _____

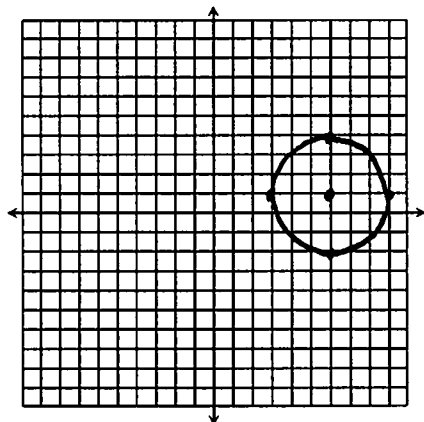
Unit 10: Circles

Date: _____ Per: _____

Homework 9: Standard Form of a Circle

**** This is a 2-page document! ******Directions:** Graph each circle and identify its center and radius.

1. $(x-6)^2 + (y-1)^2 = 9$



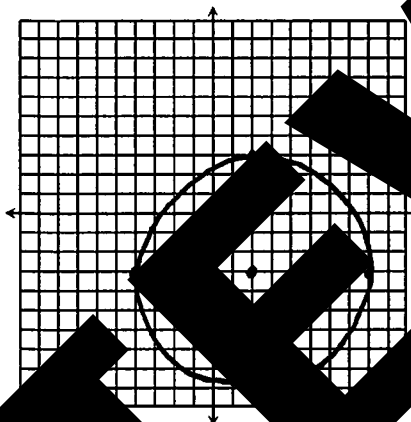
Center:

(6, 1)

Radius:

3

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

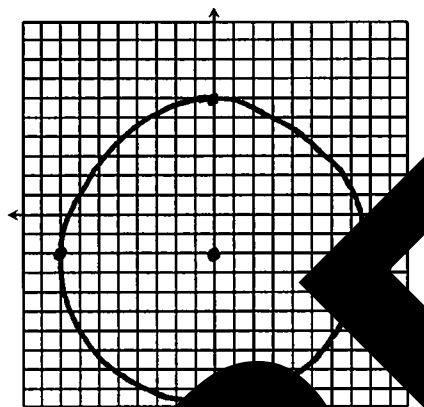


(2, -3)

Radius:

6

3. $x^2 + (y+2)^2 = 64$



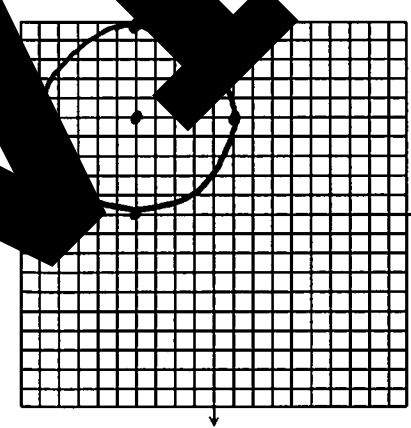
Center:

(0, -2)

Radius:

8

4. $(x+4)^2 + (y-5)^2 = 25$



Center:

(-4, 5)

Radius:

5

Directions: Identify each part of the circle given its equation.

5. $(x-9)^2 + (y-4)^2 = 400$

Center: (9, 4)

Radius: 20

6. $(x+1)^2 + (y-1)^2 = 64$

Center: (-1, 1)

Diameter: 32

7. $(x+6)^2 + y^2 = 90.25$

Center: (-6, 0)

Diameter: 19

8. $(x-2)^2 + (y+13)^2 = 150$

Center: (2, -13)

Radius: $5\sqrt{6}$

9. $(x-7)^2 + (y+4)^2 = 16$

Center: (-7, -4)

Circumference: 8π (25.1)

10. $(x-10)^2 + (y-5)^2 = 28$

Radius: $2\sqrt{7}$ Circumference: $4\pi\sqrt{7}$ (33.2)

11. $x^2 + (y+3)^2 = 81$

Center: (0, -3)

Area: 81π (254.5)

12. $(x+5)^2 + (y-2)^2 = 135$

Diameter: $6\sqrt{15}$ Area: 135π (424.1)

Write each equation in standard form. Then identify each part.			
13. $x^2 + y^2 + 8x - 6y - 25 = 0$ $x^2 + 8x + y^2 - 6y = 25$ $x^2 + 8x + \underline{16} + y^2 - 6y + \underline{9} = 25 + \underline{16} + \underline{9}$ $(x+4)^2 + (y-3)^2 = 50$		14. $x^2 + y^2 - 4x - 12y - 129 = 0$ $x^2 - 4x + y^2 - 12y = 129$ $x^2 - 4x + \underline{4} + y^2 - 12y + \underline{36} = 129 + \underline{4} + \underline{36}$ $(x-2)^2 + (y-6)^2 = 169$	
Standard Form: $(x+4)^2 + (y-3)^2 = 50$		Standard Form: $(x-2)^2 + (y-6)^2 = 169$	
Center: $(-4, 3)$	Radius: $5\sqrt{2}$	Center: $(2, 6)$	Radius: 13
15. $x^2 + y^2 + 14x + 10y + 73 = 0$ $x^2 + 14x + y^2 + 10y = -73$ $x^2 + 14x + \underline{49} + y^2 + 10y + \underline{25} = -73 + \underline{49} + \underline{25}$ $(x+7)^2 + (y+5)^2 = 25$		16. $x^2 + y^2 - 16x - 12y + 101 = 0$ $x^2 - 16x + y^2 - 12y = -101$ $x^2 - 16x + \underline{64} + y^2 - 12y + \underline{36} = -101 + \underline{64} + \underline{36}$ $(x-8)^2 + (y-6)^2 = 225$	
Standard Form: $(x+7)^2 + (y+5)^2 = 25$		Standard Form: $(x-8)^2 + (y-6)^2 = 225$	
Center: $(-7, -5)$	Diameter: 5	Center: $(8, 6)$	Diameter: 15
17. $x^2 + y^2 - 24x + 4y - 15 = 0$ $x^2 - 24x + y^2 + 4y = 15$ $x^2 - 24x + \underline{144} + y^2 + 4y + \underline{4} = 15 + \underline{144} + \underline{4}$ $(x-12)^2 + (y+2)^2 = 163$		18. $x^2 + y^2 - 9x + 2y = x - 6y + 59$ $x^2 - 10x + y^2 + 8y = 59$ $x^2 - 10x + \underline{25} + y^2 + 8y + \underline{16} = 59 + \underline{25} + \underline{16}$ $(x-5)^2 + (y+4)^2 = 100$	
Standard Form: $(x-12)^2 + (y+2)^2 = 163$		Standard Form: $(x-5)^2 + (y+4)^2 = 100$	
Diameter: $6\sqrt{3}$	Circumference: $6\pi\sqrt{3}$	Radius: 10	Area: 100π (314.2)

Name:

Date:

Topic:

Class:

Main Ideas/Questions

Notes/Examples

WRITING EQUATIONS of Circles

Recall: The standard form of the equation of a circle is:

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

where (h, k) is the center and r is the radius.

Write each circle equation in standard form with the given information.

Set 1: Given the center and radius/diameter.

1. center: $(5, 3)$, radius: 2

$$(x-5)^2 + (y-3)^2 = 4$$

2. center: $(-1, 7)$, radius: 14

$$(x+1)^2 + (y-7)^2 = 196$$

3. center: $(-2, -11)$, diameter: 18

$$(x+2)^2 + (y+11)^2 = 81$$

4. center: $(9, 9)$, diameter: 32 ($r=16$)

$$(x-9)^2 + (y-9)^2 = 256$$

5. center: $(-4, 4)$, radius: $\sqrt{47}$

$$(x+4)^2 + (y-4)^2 = 47$$

6. center: $(15, -6)$, radius: $\sqrt{158}$

$$(x-15)^2 + (y+6)^2 = 158$$

Set 2: Given the center and circumference/area.

7. center: $(3, 4)$, circumference: 6π ($r=3$)

$$(x-3)^2 + (y-4)^2 = 9$$

8. center: $(9, 12)$, circumference: 17π ($r=8.5$)

$$(x-9)^2 + (y-12)^2 = 72.25$$

9. center: $(-1, -6)$, area: 16π ($r=4$)

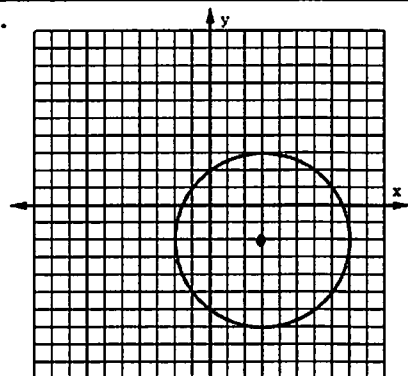
$$(x+1)^2 + (y+6)^2 = 16$$

10. center: $(2, -2)$, area: 36π ($r=19$)

$$(x-2)^2 + (y+2)^2 = 361$$

Set 3: Given a graph.

11.

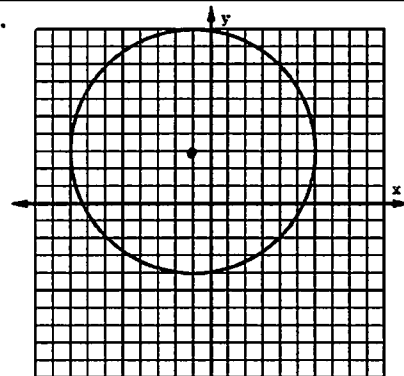


$C(3, -2)$

$r=5$

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

12.

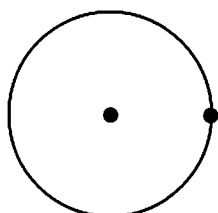


$C(-1, 3)$

$r=7$

$$(x+1)^2 + (y-3)^2 = 49$$

RECALL →



Set 4: Given the center and a point on the circle.

Distance Formula

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Midpoint Formula

$$MP = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

13. center: (9, 10),
point on circle: (7, 4)

$$\begin{aligned} \text{rad} &= \sqrt{(9-7)^2 + (10-4)^2} \\ &= \sqrt{4 + 36} \\ &= \sqrt{40} \end{aligned}$$

$$(x-9)^2 + (y-10)^2 = 40$$

14. center: (1, -5),
point on circle: (13, -2)

$$\begin{aligned} \text{rad} &= \sqrt{(1-13)^2 + (-5+2)^2} \\ &= \sqrt{144 + 9} \\ &= \sqrt{153} \end{aligned}$$

$$(x-1)^2 + (y+5)^2 = 153$$

15. center: (2, -6),
point on circle: (1, 10)

$$\begin{aligned} \text{rad} &= \sqrt{(2-1)^2 + (-6-10)^2} \\ &= \sqrt{1 + 256} \\ &= \sqrt{257} \end{aligned}$$

$$(x-2)^2 + (y+6)^2 = 257$$

16. center: (-2, 0),
point on circle: (9, -4)

$$\begin{aligned} \text{rad} &= \sqrt{(-2-9)^2 + (0+4)^2} \\ &= \sqrt{81 + 16} \\ &= \sqrt{97} \end{aligned}$$

$$(x+2)^2 + y^2 = 97$$

Set 5: Given two points on a diameter.

17. (6, -13) and (-2, 15)
MP = $\left(\frac{6-2}{2}, \frac{-13+15}{2} \right) = (2, 1)$

$$\begin{aligned} \text{rad} &= \sqrt{(6-2)^2 + (-13-1)^2} \\ &= \sqrt{16 + 196} \\ &= \sqrt{212} \end{aligned}$$

$$(x-2)^2 + (y-1)^2 = 212$$

18. (6, -13) and (-2, 15)

$$MP = \left(\frac{6-2}{2}, \frac{-13+15}{2} \right) = (2, 1)$$

$$\begin{aligned} \text{rad} &= \sqrt{(6-2)^2 + (-13-1)^2} \\ &= \sqrt{16 + 196} \\ &= \sqrt{212} \end{aligned}$$

$$(x-2)^2 + (y-1)^2 = 212$$

19. (6, -16) and (-4, 8)

$$MP = \left(\frac{6-4}{2}, \frac{-16+8}{2} \right) = (1, -4)$$

$$\begin{aligned} \text{rad} &= \sqrt{(6-1)^2 + (-16+4)^2} \\ &= \sqrt{25 + 144} \\ &= \sqrt{169} \end{aligned}$$

$$(x-1)^2 + (y+4)^2 = 169$$

20. (8, 7) and (-10, -13)

$$MP = \left(\frac{8-10}{2}, \frac{7-13}{2} \right) = (-1, -3)$$

$$\begin{aligned} \text{rad} &= \sqrt{(8+1)^2 + (7+3)^2} \\ &= \sqrt{81 + 100} \\ &= \sqrt{181} \end{aligned}$$

$$(x+1)^2 + (y+3)^2 = 181$$

Name: _____

Unit 10: Circles

Date: _____ Per: _____

Homework 10: Equations of Circles

**** This is a 2-page document! ******Directions:** Use the information given to write the equation of the circle in standard form.

1. center: (2, 8), radius: 3

$$(x-2)^2 + (y-8)^2 = 9$$

3. center: (-9, -7), diameter: 34

$$(x+9)^2 + (y+7)^2 = 289$$

5. center: (0, -16), radius: $\sqrt{15}$

$$x^2 + (y+16)^2 = 15$$

2. center: (5, -13), radius: 11

$$(x-5)^2 + (y+13)^2 = 121$$

4. center: (-8, 0), diameter: 12

$$(x+8)^2 + y^2 = 36$$

6. center: (12, 1), radius: $\sqrt{209}$

$$(x-12)^2 + (y-1)^2 = 209$$

7. center: (10, 7), circumference: 14π ($r=7$)

$$(x-10)^2 + (y-7)^2 = 49$$

8. center: (0, -1), circumference: 25π ($r=12.5$)

$$(x)^2 + (y+1)^2 = 156.25$$

9. center: (-4, -5), area: 400π ($r=20$)

$$(x+4)^2 + (y+5)^2 = 400$$

10. center: (6, 2), area: π ($r=1$)

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

Use for questions 11-12: A pizzeria will only deliver pizzas within a certain distance of the pizzeria. The delivery radius has an area of 36π square miles.

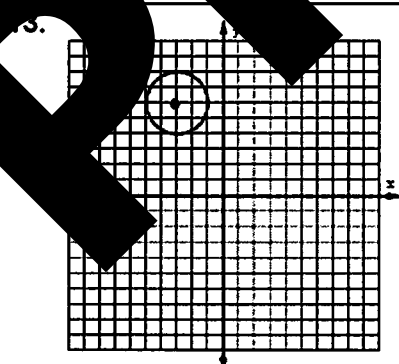
11. Assuming the pizzeria is located at the origin, write an equation for the circle in which the pizzeria will deliver. Standard form where r represents the distance from the pizzeria in miles.

12. Mikayla lives 4 miles north and 6 miles west of the pizzeria. Will the pizzeria deliver to her home?

$$(-6)^2 + (4)^2 \leq 36$$

$$36 + 16 \leq 36$$

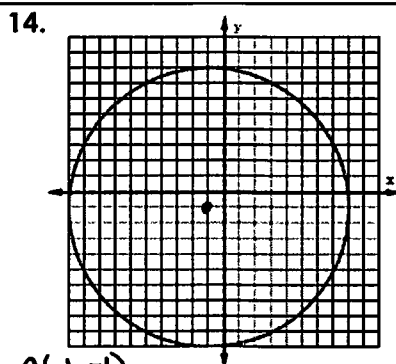
$$52 \leq 36$$

No!**Directions:** Write the equation for the circle shown on the graph in standard form.

$$C(-3, 6)$$

$$r=2$$

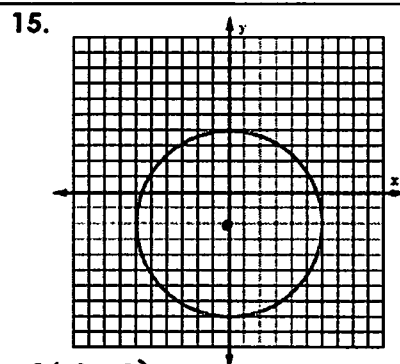
$$(x+3)^2 + (y-6)^2 = 4$$



$$C(-1, -1)$$

$$r=4$$

$$(x+1)^2 + (y+1)^2 = 16$$



$$C(0, -2)$$

$$r=6$$

$$x^2 + (y+2)^2 = 36$$

Directions: Use the information given to write the equation of the circle in standard form.

16. center: (-10, -4), point on circle: (4, -2)

$$\begin{aligned} \text{rad} &= \sqrt{(-10-4)^2 + (-4+2)^2} \\ &= \sqrt{196 + 4} \\ &= \sqrt{200} \end{aligned}$$

$$(x+10)^2 + (y+4)^2 = 200$$

17. center: (-9, -3), point on circle: (-11, 2)

$$\begin{aligned} \text{rad} &= \sqrt{(-9+11)^2 + (-3-2)^2} \\ &= \sqrt{4 + 25} \\ &= \sqrt{29} \end{aligned}$$

$$(x+9)^2 + (y+3)^2 = 29$$

18. center: (5, -7), point on circle: (-3, -1)

$$\begin{aligned} \text{rad} &= \sqrt{(5+3)^2 + (-7+1)^2} \\ &= \sqrt{64 + 36} \\ &= \sqrt{100} = 10 \end{aligned}$$

$$(x-5)^2 + (y+7)^2 = 100$$

19. center: (2, -2), point on circle: (14, 4)

$$\begin{aligned} \text{rad} &= \sqrt{(2-14)^2 + (-2-4)^2} \\ &= \sqrt{144 + 36} \\ &= \sqrt{180} = \sqrt{45} \end{aligned}$$

$$(x-2)^2 + (y+2)^2 = 45$$

20. endpoints of diameter: (13, -1) and (-15, -5)

$$\text{MP} = \left(\frac{13-15}{2}, \frac{-1-5}{2} \right) = (-1, -3)$$

$$\begin{aligned} \text{rad} &= \sqrt{(12-1)^2 + (-4+3)^2} \\ &= \sqrt{121 + 1} \\ &= \sqrt{122} \end{aligned}$$

$$(x+1)^2 + (y+3)^2 = 122$$

21. endpoints of diameter: (6, -2) and (10, -10)

$$\text{MP} = \left(\frac{6+10}{2}, \frac{-2-10}{2} \right) = (8, -6)$$

$$\begin{aligned} \text{rad} &= \sqrt{(6-8)^2 + (-2+6)^2} \\ &= \sqrt{4 + 16} \\ &= \sqrt{20} \end{aligned}$$

$$(x-8)^2 + (y+6)^2 = 20$$

22. endpoints of diameter: (-8, 12) and (0, 2)

$$\text{MP} = \left(\frac{-8+0}{2}, \frac{12+2}{2} \right) = (-4, 7)$$

$$\begin{aligned} \text{rad} &= \sqrt{(0+4)^2 + (2-7)^2} \\ &= \sqrt{16 + 25} \\ &= \sqrt{41} \end{aligned}$$

$$(x+4)^2 + (y-7)^2 = 41$$

23. endpoints of diameter: (8, -1) and (-2, 3)

$$\text{MP} = \left(\frac{8-2}{2}, \frac{-1+3}{2} \right) = (3, 1)$$

$$\begin{aligned} \text{rad} &= \sqrt{(8-3)^2 + (-1-1)^2} \\ &= \sqrt{25 + 4} \\ &= \sqrt{29} \end{aligned}$$

$$(x-3)^2 + (y-1)^2 = 29$$

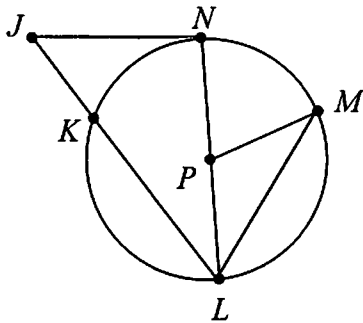
Unit 10 Test Study Guide (Circles)

Name: _____

Date: _____ Per: _____

Topic 1: Parts of Circles

1. Using the diagram below, give an example of each circle part.



- a. Center: P
 * b. Radius: PM
 c. Diameter: NL
 d. Chord: ML
 e. Secant: JL
 f. Tangent: JN
 * g. Central Angle: NP
 * h. Inscribed Angle: LMN
 * i. Minor Arc: NM
 * j. Major Arc: NLM
 k. Secant Line: NKL

Topic 2: Area & Circumference

2. Find the area and circumference of the circle with radius $r = 8.3$.

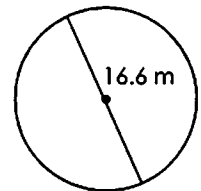
$$A = \pi (8.3)^2$$

$$= 68.89\pi$$

$$\approx \boxed{216.42 \text{ m}^2}$$

$$C = 16\pi$$

$$\approx \boxed{50.27}$$



3. Find the radius of a circle with a circumference of 106.81 centimeters. Find the diameter of a circle with an area of 95.03 square feet.

$$\frac{106.81}{2\pi} = \frac{2\pi r}{2\pi}$$

$$r = \boxed{8.5}$$

$$\frac{95.03}{\pi} = \frac{\pi r^2}{\pi}$$

$$30.25 = r^2$$

$$r = 5.5$$

$$\boxed{d = 11 \text{ ft}}$$

5. Find the circumference of a circle with an area of 254.47 square inches.

$$\frac{254.47}{\pi} = \frac{\pi r^2}{\pi}$$

$$\approx \boxed{56.55 \text{ in}}$$

6. Find the area of a circle with a circumference of 30π meters.

$$\frac{30\pi}{2\pi} = \frac{2\pi r}{2\pi}$$

$$15 = r$$

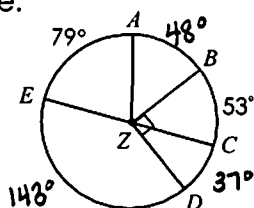
$$A = \pi (15)^2$$

$$= 225\pi$$

$$\approx \boxed{706.86 \text{ m}^2}$$

Central Angles

7. Find each arc measure.



a) $m\widehat{CD} = \underline{37^\circ}$

d) $m\widehat{EB} = \underline{127^\circ}$

b) $m\widehat{AB} = \underline{48^\circ}$

e) $m\widehat{BDE} = \underline{233^\circ}$

c) $m\widehat{ED} = \underline{143^\circ}$

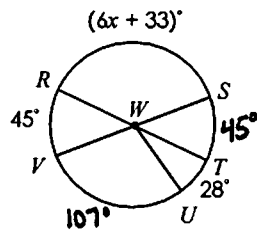
f) $m\widehat{DEC} = \underline{323^\circ}$

8. Solve for x .

$$6x + 33 = 135$$

$$6x = 102$$

$$x = 17$$



9. Find $m\widehat{EF}$.

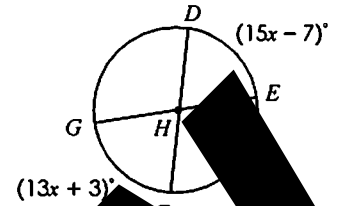
$$15x - 7 = 13x + 3$$

$$2x - 7 = 3$$

$$2x = 10$$

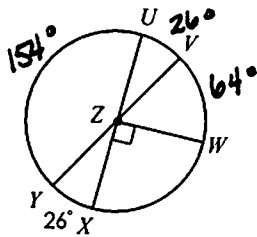
$$x = 5$$

$$m\widehat{EF} = 112^\circ$$



Topic 4: Arc Lengths

If the circle below has a radius of 15 cm, find each arc length.



10. $\widehat{VW}$

$$l = \frac{64 \cdot 30\pi}{360}$$

$$= \frac{1920\pi}{360}$$

$$\approx 16.76 \text{ cm}$$

11. $\widehat{EF}$

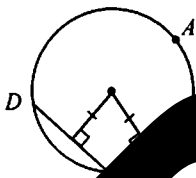
$$\frac{334 \cdot 30\pi}{360}$$

$$= \frac{10020\pi}{360}$$

$$\approx 87.44 \text{ cm}$$

Topic 5: Chords & Arcs

12. If $m\widehat{DC} = (12x + 7)^\circ$ and $m\widehat{AB} = (18x - 2)^\circ$, find $m\widehat{DAB}$.



$$18x - 2 = 12x + 7$$

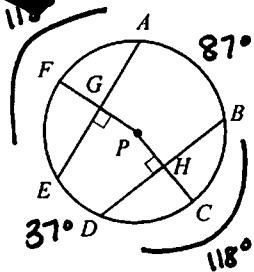
$$6x = 9$$

$$x = 1.5$$

$$m\widehat{DC} = 67^\circ$$

$$m\widehat{DAB} = 226^\circ$$

If $GP = PH$, $GA = 17$, $m\widehat{ED} = 37^\circ$, and $m\widehat{AB} = 87^\circ$, find each measure.



$$DB = 34$$

$$EG = 17$$

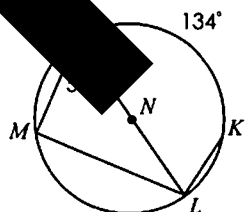
$$m\widehat{DB} = 118^\circ$$

$$m\widehat{FA} = 59^\circ$$

$$m\widehat{DC} = 59^\circ$$

Topic 6: Inscribed Angles

Find each measure.



$$a) m\widehat{ML} = 118^\circ$$

$$b) m\angle JLK = 67^\circ$$

$$c) m\angle JLM = 31^\circ$$

$$d) m\widehat{MJ} = 62^\circ$$

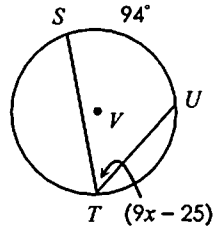
15. Solve for x .

$$9x - 25 = \frac{1}{2}(94)$$

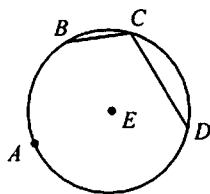
$$9x - 25 = 47$$

$$9x = 72$$

$$x = 8$$



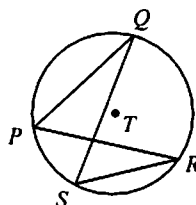
16. If $m\angle BCD = (7x + 10)^\circ$ and $m\widehat{BAD} = (19x - 50)^\circ$, find $m\widehat{BAD}$.



$$\begin{aligned} 2(7x + 10) &= 19x - 50 \\ 14x + 20 &= 19x - 50 \\ 70 &= 5x \\ x &= 14 \end{aligned}$$

$$m\widehat{BAD} = 19(14) - 50 = 216^\circ$$

17. If $m\angle PQS = (6x + 1)^\circ$ and $m\angle PRS = (34 - 5x)^\circ$, find $m\widehat{PS}$.

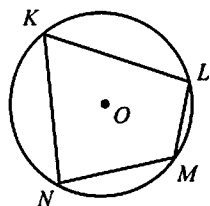


$$\begin{aligned} 6x + 1 &= 34 - 5x \\ 11x &= 33 \\ x &= 3 \end{aligned}$$

$$m\angle PQS = 19^\circ$$

$$m\widehat{PS} = 2(19) = 38^\circ$$

18. If $m\angle K = (8x - 19)^\circ$ and $m\angle M = (5x + 43)^\circ$, find $m\angle M$.



$$8x - 19 + 5x + 43 = 180$$

$$13x + 24 = 180$$

$$13x = 156$$

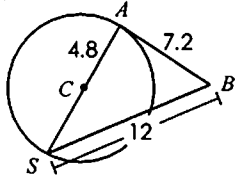
$$x = 12$$

$$m\angle M = 5(12) + 43 = 103^\circ$$

Topic 7: Tangents

For questions 19-20, determine if $\overline{AB}$ is tangent to circle C.

19.



$$7.2^2 + 9.6^2 = 144$$

$$144 = 144$$

Yes!

$$15^2 + 11.2^2 = 18^2$$

$$350.44 \neq 324$$

No!

For questions 21-22, determine if the segments that appear to be tangent are tangent.

21.



$$4x + 23 = 10x - 19$$

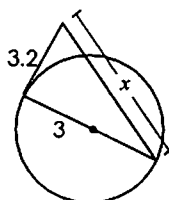
$$42 = 6x$$

$$x = 7$$

$$x \approx 17.23$$

$$EF = 51$$

22.

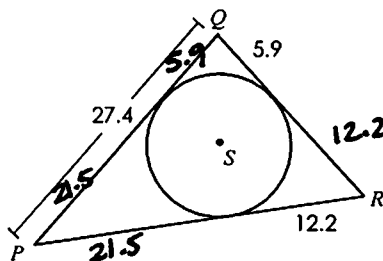


$$3.2^2 + 6^2 = x^2$$

$$46.24 = x^2$$

$$x = 6.8$$

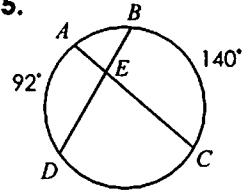
24. Find the perimeter of $\triangle PQR$.

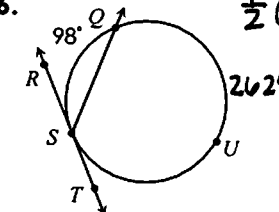


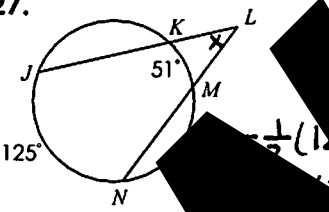
$$\text{Perimeter} = 79.2$$

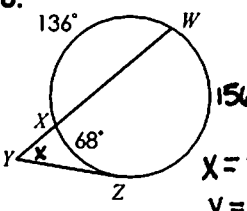
Topic 8: Angles formed by Intersecting Chords, Secants, & Tangents

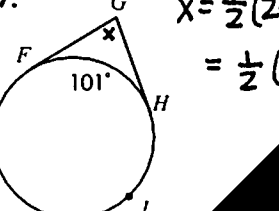
For questions 25-33, find each measure. Assume segments that appear to be tangent are tangent.

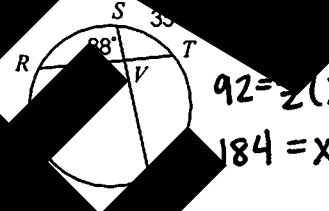
25.  $\frac{1}{2}(92+140)$
 $\frac{1}{2}(232)$
 $m\angle AED = 116^\circ$
 $m\angle DEC = 64^\circ$

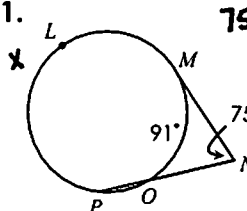
26.  $\frac{1}{2}(262)$
 $m\angle QST = 131^\circ$

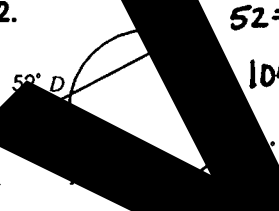
27.  $\frac{1}{2}(125+51)$
 $m\angle KLM = 31^\circ$

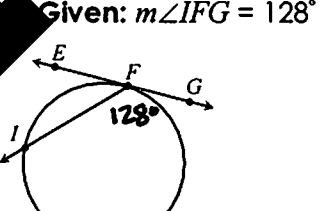
28.  $\frac{1}{2}(136+68)$
 $\frac{1}{2}(204)$
 $m\angle XYZ = 102^\circ$

29.  $\frac{1}{2}(101+259)$
 $\frac{1}{2}(360)$
 $m\angle FGH = 180^\circ$

30.  $\frac{1}{2}(88+36)$
 $\frac{1}{2}(124)$
 $m\angle RSU = 62^\circ$

31.  $\frac{1}{2}(91+75)$
 $\frac{1}{2}(166)$
 $m\angle MNP = 83^\circ$

32.  $\frac{1}{2}(58+104)$
 $\frac{1}{2}(162)$
 $m\angle FDE = 81^\circ$

33.  $\frac{1}{2}(128+128)$
 $\frac{1}{2}(256)$
 $m\angle IFH = 128^\circ$

34. If $m\widehat{DH} = (11x + 7)^\circ$, $m\widehat{GF} = (x + 9)^\circ$, and $m\angle GEF = (10x - 22)^\circ$, find $m\widehat{DH}$.

$$2(10x - 22) = 11x + 7 + x + 9$$

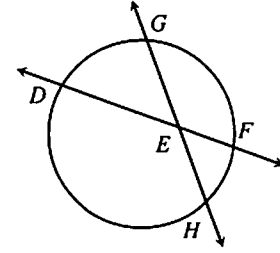
$$20x - 44 = 12x + 16$$

$$8x = 60$$

$$x = 7.5$$

$$m\widehat{DH} = 11(7.5) + 7$$

$$= 172^\circ$$



35. If $m\widehat{OP} = (11x - 38)^\circ$ and $m\angle LMP = (3x + 41)^\circ$, find $m\angle NMP$.

$$11x - 38 = 2(3x + 41)$$

$$11x - 38 = 6x + 82$$

$$5x - 38 = 82$$

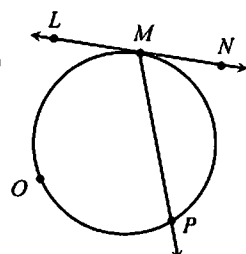
$$5x = 120$$

$$x = 24$$

$$m\angle LMP = 3(24) + 41$$

$$= 113^\circ$$

$$m\angle NMP = 67^\circ$$



36. If $m\widehat{RU} = (16x - 13)^\circ$, $m\widehat{SU} = (11x - 24)^\circ$, and $m\angle STU = (3x + 1)^\circ$, find $m\widehat{SU}$.

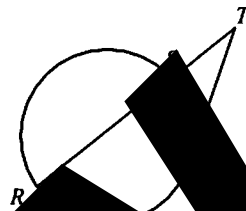
$$3x + 1 = \frac{1}{2} (16x - 13 - (11x - 24))$$

$$6x + 2 = 16x - 13 - 11x + 24$$

$$6x + 2 = 5x + 11$$

$$x = 9$$

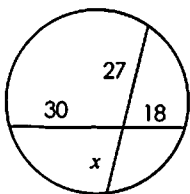
$$m\widehat{SU} = 11(9) - 24 = 75^\circ$$



Topic 9: Segment Lengths formed by Intersecting Chords, Secants, & Tangents

For questions 37-40, solve for x . Assume segments that all appear to be tangent are tangent.

37.

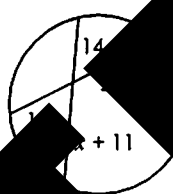


$$27 \cdot x = 30 \cdot 18$$

$$27x = 540$$

$$x = 20$$

38.



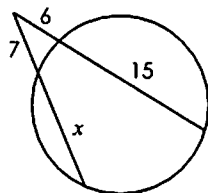
$$16(2x - 5) = (x + 11)(11)$$

$$32x - 80 = 14x + 154$$

$$18x = 234$$

$$x = 13$$

39.



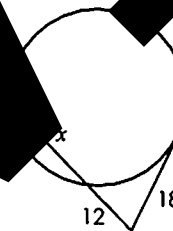
$$7(x + 7) = 16(7)$$

$$7x + 49 = 112$$

$$7x = 63$$

$$x = 9$$

40.



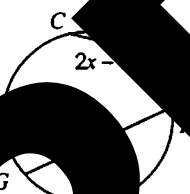
$$18^2 = 12(x + 12)$$

$$324 = 12x + 144$$

$$180 = 12x$$

$$x = 15$$

41. Find CD .



$$x(x + 2) = 18 \cdot 108$$

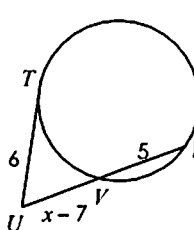
$$x^2 + 2x = 1944$$

$$18x = 108$$

$$x = 6$$

$$CD = 2(6) - 7 = 5$$

42. Find UW .



$$6^2 = (x - 7)(x - 2)$$

$$36 = x^2 - 9x + 14$$

$$0 = x^2 - 9x - 22$$

$$0 = (x - 11)(x + 2)$$

$$x = 11 \quad x = -2$$

$$UW = 9$$

Topic 10: Equations of Circles

Identify the center and radius/diameter for the following circles.

43. $(x + 2)^2 + (y - 7)^2 = 16$

Center: $(-2, 7)$

Radius: 4

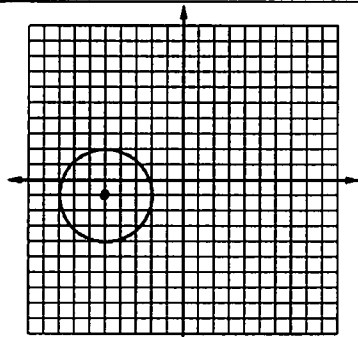
44. $x^2 + (y + 6)^2 = 121$

Center: $(0, -6)$

Diameter: 22

Write the equation of the circle in standard form shown on the graph.

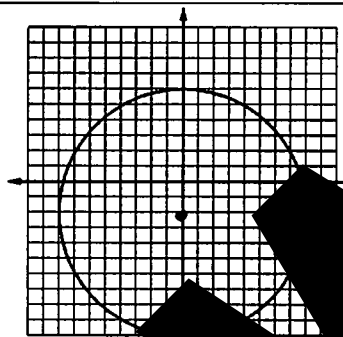
45.



$C(-5, -1)$
 $r=3$

$$(x+5)^2 + (y+1)^2 = 9$$

46.



$C(0, -2)$
 $r=8$

$$x^2 + (y+2)^2 = 64$$

Write an equation of the circle in standard form with the given characteristics.

47. center: $(-3, 4)$, radius: 7

$$(x+3)^2 + (y-4)^2 = 49$$

48. center: $(-9, 5)$, diameter: 20 ($r=10$)

$$(x+9)^2 + (y-5)^2 = 100$$

49. center: $(-7, -1)$, diameter: 9 ($r=4.5$)

$$(x+7)^2 + (y+1)^2 = 20.25$$

center: $(12, 5)$, radius: 7

$$(x-12)^2 + (y-5)^2 = 49$$

51. center: $(2, -2)$, circumference: 12π ($r=6$)

$$(x-2)^2 + (y+2)^2 = 36$$

52. center: $(5, -10)$, area: 225π ($r=15$)

$$x^2 + (y+10)^2 = 225$$

53. center: $(-4, 7)$, point on circle: $(-1, 9)$

$$\begin{aligned} \text{rad} &= \sqrt{(-4+1)^2 + (7-9)^2} \\ &= \sqrt{9+4} \\ &= \sqrt{13} \end{aligned}$$

$$(x+4)^2 + (y-7)^2 = 13$$

center: $(-5, 4)$, endpoints of diameter: $(-18, -3)$ and $(8, 11)$

$$\begin{aligned} \text{center} &= \left(\frac{-18+8}{2}, \frac{-3+11}{2} \right) = (-5, 4) \\ \text{rad} &= \sqrt{(8+5)^2 + (11-4)^2} \\ &= \sqrt{169+49} \\ &= \sqrt{218} \end{aligned}$$

$$(x+5)^2 + (y-4)^2 = 218$$

Write the equation of the circle in standard form. Then identify the center and radius.

55. $x^2 + y^2 - 8x + 12y - 18 = 0$

$$\begin{aligned} x^2 - 8x + 16 + y^2 + 12y + 36 - 50 &= -34 + 16 + 36 \\ (x-4)^2 + (y+6)^2 &= 18 \end{aligned}$$

center: $(4, -6)$

radius: $\sqrt{18} = 3\sqrt{2}$

56. $x^2 + y^2 + x = 279 + 3x - 6y$

$$\begin{aligned} x^2 + y^2 - 2x + 6y &= 279 \\ x^2 - 2x + 1 + y^2 + 6y + 9 &= 279 + 1 + 9 \\ (x-1)^2 + (y+3)^2 &= 289 \end{aligned}$$

center: $(1, -3)$

radius: 17

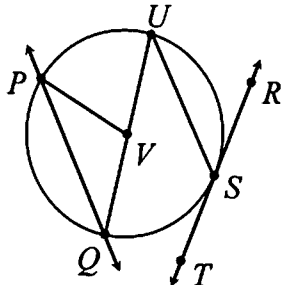
Name: _____

Date: _____ Per: _____

Unit 10 Test

Circles

Use the diagram below for questions 1-3.



1. Which of the following is a tangent?

- A. $\overline{PV}$ B. $\overline{US}$ C. $\overline{RT}$ D. $\overline{PQ}$

2. Which of the following is a chord?

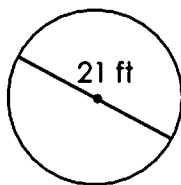
- A. $\overline{PV}$ B. $\overline{US}$ C. $\overline{RT}$

3. Which of the following is an inscribed angle?

- A. $\angle PVU$ B. $\angle UST$ C. $\angle USR$ D. $\angle USR$

C

Use the circle below for questions 4 and 5.



4. Find the circumference. Round to the nearest hundredth.

$$C = 2\pi r$$

$$= 2\pi(21)$$

$$= 42\pi$$

$$\approx 132.1$$

$$C = 65.97 \text{ ft}$$

5. Find the area. Round to the nearest hundredth.

$$A = \pi r^2$$

$$= \pi(21)^2$$

$$= 441\pi$$

$$\approx 1385.44$$

$$A = 346.36 \text{ ft}^2$$

6. Find the diameter of a circle with an area of 226.98 square inches.

$$\frac{226.98}{\pi} = \pi r^2$$

$$72.28 = r^2$$

$$r = 8.5$$

$$d = 17 \text{ in}$$

$$= 17 \text{ in}$$

7. Find the circumference of a circle with an area of 530.93 square meters.

$$\frac{530.93}{\pi} = \frac{\pi r^2}{\pi}$$

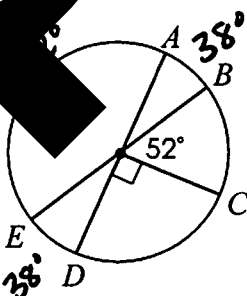
$$r^2 = 169$$

$$r = 13$$

$$C = 2\pi r$$

$$C = 81.68 \text{ m}$$

Use the circle below for questions 8 and 9.



8. Find $m\widehat{ED}$.

$$m\widehat{ED} = 38^\circ$$

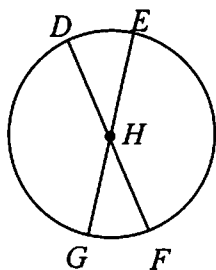
9. Find $m\widehat{EA}$.

$$m\widehat{EA} = 142^\circ$$

10. Find $m\widehat{BDC}$.

$$m\widehat{BDC} = 308^\circ$$

11. In circle H , if $m\angle DHG = (11x - 36)^\circ$ and $m\angle GHF = (x + 12)^\circ$, find $m\widehat{DG}$.



$$11x - 36 + x + 12 = 180$$

$$12x - 24 = 180$$

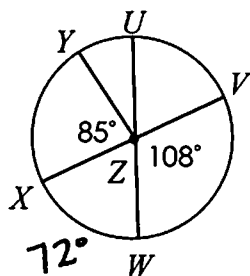
$$12x = 204$$

$$x = 17$$

$$m\angle DHG = 11(17) - 36$$

$$= 171^\circ$$

Use the circle below for questions 12 and 13.



$XV = 24$ meters

12. Find the length of $\widehat{XW}$. Round to the nearest hundredth.

$$\frac{12 \cdot 24\pi}{360} = \frac{1728\pi}{360}$$

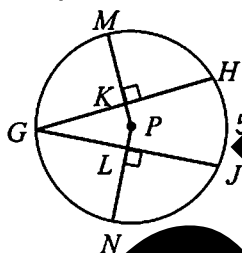
$$\widehat{XW} = 15.08 \text{ m}$$

13. Find the length of $\widehat{YV}$. Round to the nearest hundredth.

$$\frac{337 \cdot 24\pi}{360} = \frac{88\pi}{1}$$

$$\widehat{YV} = 70.58 \text{ m}$$

Use the circle below for questions 14-15.



$KP = PL = 18$ ft

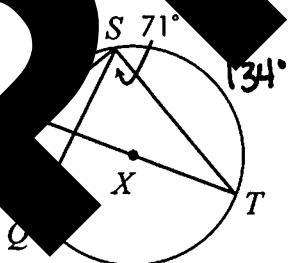
14. Find LJ .

$$LJ = 18$$

15. Find $m\widehat{GM}$.

$$m\widehat{GM} = 77^\circ$$

Use the circle below for questions 16-18.



16. Find $m\widehat{QT}$.

$$2(71)$$

$$m\widehat{QT} = 142^\circ$$

17. Find $m\angle STR$.

$$\frac{1}{2}(46)$$

$$m\angle STR = 23^\circ$$

18. Find $m\widehat{ST} - m\widehat{RQ}$.

$$134^\circ - 38^\circ$$

- A. 90°
- B. 92°
- C. 94°
- D. 96°

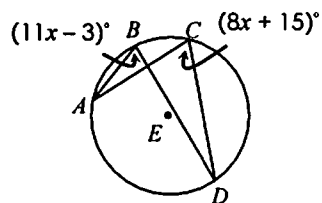
D

19. Find $m\widehat{AD}$.

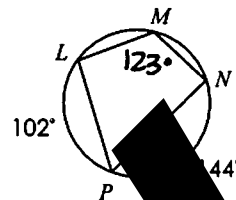
$$\begin{aligned} 11x - 3 &= 8x + 15 \\ 3x &= 18 \\ x &= 6 \end{aligned}$$

$$2(63) = 126$$

$$m\widehat{AD} = 126^\circ$$

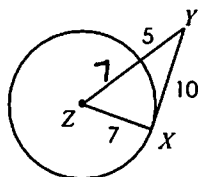


20. Find $m\angle LPN$.

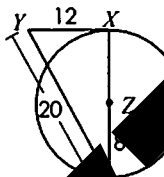


$$m\angle LPN = 51^\circ$$

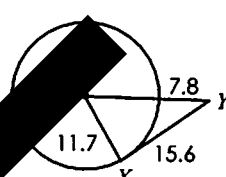
21. Which diagram(s) show $\overline{XY}$ tangent to circle Z? Check all that apply.



$$\begin{aligned} 10^2 + 7^2 &= 12^2 \\ 149 &\neq 144 \end{aligned}$$



$$\begin{aligned} 16^2 + 12^2 &= 20^2 \\ 400 &= 400 \end{aligned}$$



$$\begin{aligned} 11.7^2 + 15.6^2 &= 19.5^2 \\ 380.25 &= 380.25 \end{aligned}$$

For questions 22-34, assume the line segments that appear to be tangent are tangent.

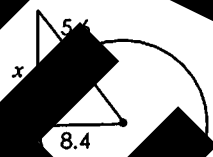
22. Find the value of x .

$$x^2 + 8.4^2 = 14^2$$

$$x^2 + 70.56 = 196$$

$$x^2 = 125.44$$

$$x = 11.2$$

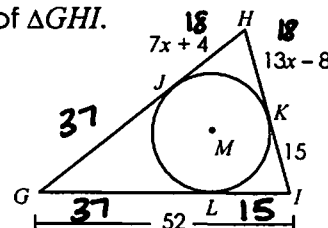


Find the perimeter of $\triangle GHI$.

$$13x - 8 = 7x + 4$$

$$6x = 12$$

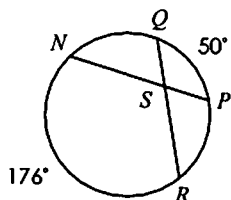
$$x = 2$$



$$P = 140$$

24. Find $m\angle NSR$.

$$2(63)$$



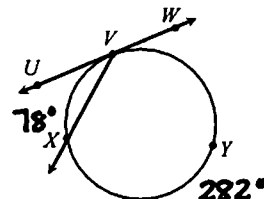
$$m\angle NSR = 113^\circ$$

25. If $m\widehat{VYX} = 282^\circ$ and $m\angle UVX = (4x - 5)^\circ$, find the value of x .

$$4x - 5 = 39$$

$$4x = 44$$

$$x = 11$$



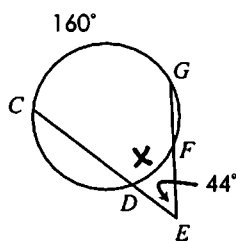
$$x = 11$$

26. Find $m\widehat{DF}$.

$$44 = \frac{1}{2}(160 - x)$$

$$88 = 160 - x$$

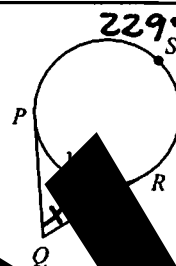
$$x = 72$$



$$m\widehat{DF} = 72^\circ$$

27. Find $m\angle PQR$.

$$\frac{1}{2}(229 - 131)$$



$$m\angle PQR = 49^\circ$$

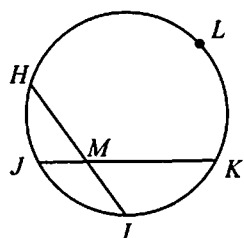
28. If $m\widehat{JI} = (3x + 2)^\circ$, $m\widehat{HLK} = (15x - 36)^\circ$, and $m\angle HMK = (8x - 1)^\circ$, find $m\widehat{HLK}$.

$$8x - 1 = \frac{1}{2}(3x + 2 + 15x - 36)$$

$$16x - 2 = 18x - 34$$

$$32 = 2x$$

$$16 = x$$



$$m\widehat{HLK} = 15(16) - 36 = 204^\circ$$

$$m\widehat{HLK} = 204^\circ$$

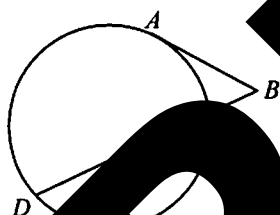
29. If $m\widehat{AD} = (17x + 2)^\circ$, $m\widehat{AC} = (7x - 10)^\circ$, and $m\angle ABC = (4x + 15)^\circ$, find $m\angle ABC$.

$$4x + 15 = \frac{1}{2}(17x + 2 + 7x - 10)$$

$$8x + 30 = 10x + 12$$

$$18 = 2x$$

$$9 = x$$



$$m\angle ABC = 4(9) + 15 = 51^\circ$$

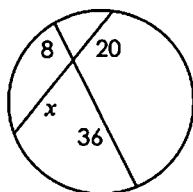
$$m\angle ABC = 51^\circ$$

Find the value of x.

$$2(36) = 20 \cdot x$$

$$72 = 20x$$

$$x = 14.4$$



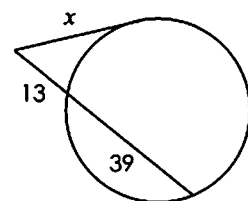
$$x = 14.4$$

31. Find the value of x.

$$x^2 = 13(39)$$

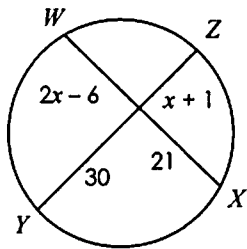
$$x^2 = 507$$

$$x = 22.5$$



$$x = 22.5$$

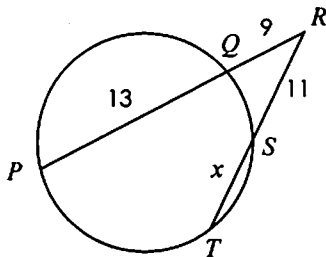
32. Find YZ .



$$\begin{aligned} 21(2x-6) &= 30(x+1) \\ 42x - 126 &= 30x + 30 \\ 12x &= 156 \\ x &= 13 \end{aligned}$$

$$YZ = 44$$

33. Find RT .

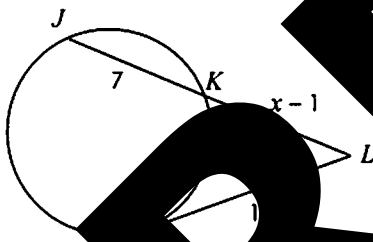


$$\begin{aligned} 9(22) &= 11(x+11) \\ 198 &= 11x + 121 \\ 77 &= 11x \\ x &= 7 \end{aligned}$$

$$RT = 9 + 7 = 18$$

$$RT = 18$$

34. Find KL .



$$\begin{aligned} 7(x-1) &= 1^2 \\ 7x - 7 &= 1 \\ 7x &= 8 \\ x &= \frac{8}{7} \end{aligned}$$

$$\begin{aligned} KL &= 10 - 1 \\ &= 9 \end{aligned}$$

$$KL = 9$$

35. Which of the following is the equation of a circle with a center located at $(-4, -1)$ and a radius of 9?

- A. $(x+4)^2 + (y-1)^2 = 9$
- B. $(x+4)^2 + (y-1)^2 = 81$
- C. $(x-4)^2 + (y+1)^2 = 9$
- D. $(x-4)^2 + (y+1)^2 = 81$

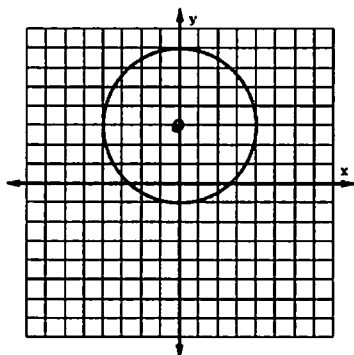
D

36. Which of the following correctly gives the center and radius of the circle defined by the equation $(x-7)^2 + (y-2)^2 = 10$?

- A. center: $(7, 2)$; radius = 100
- B. center: $(7, 2)$; radius = $\sqrt{10}$
- C. center: $(-7, -2)$; radius = 100
- D. center: $(-7, -2)$; radius = $\sqrt{10}$

B

37. Which equation represents the circle shown on the graph below?



center = (0, 3)
radius = 4

- A. $x^2 + (y - 3)^2 = 4$
B. $x^2 + (y + 3)^2 = 4$
C. $x^2 + (y - 3)^2 = 16$
D. $x^2 + (y + 3)^2 = 16$

C

38. Which equation represents a circle with a center located at $(-2, 2)$ and a circumference of 16π ?

$$\frac{16\pi}{2\pi} = \frac{2\pi r}{2\pi}$$

$$8 = r$$

- A. $(x + 2)^2 + (y - 2)^2 = 64$
B. $(x - 2)^2 + (y + 2)^2 = 64$
C. $(x + 2)^2 + (y - 2)^2 = 256$
D. $(x - 2)^2 + (y + 2)^2 = 256$

A

39. Write an equation for a circle in standard form with a center at $(-6, 5)$ and passes through the point $(-11, 3)$.

$$\text{rad} = \sqrt{(-6 + 11)^2 + (5 - 3)^2}$$

$$= \sqrt{25 + 4}$$

$$= \sqrt{29}$$

$$(x + 6)^2 + (y - 5)^2 = 29$$

40. Which statement regarding the equation below is true?

$$x^2 + y^2 - 10x + 6y + 25 = 0$$

$$x^2 - 10x + 25 + y^2 + 6y + 9 = 2 + 25 + 9$$

$$(x - 5)^2 + (y + 3)^2 = 36$$

- A. It has a diameter of 18 units.
B. It has an area of 36π square units.
C. It has a center at $(-5, 3)$.
D. It has a center at $(-2, -3)$.

B

BONUS: Find the value of x .

$$(x - 9)^2 = (2x + 2)(2x + 29)$$

$$x^2 - 18x + 81 = 4x^2 + 62x + 58$$

$$5x^2 - 116x + 23 = 0$$

$$x^2 - 116x + 115 = 0$$

$$(x - \frac{115}{5})(x - 1) = 0$$

$$(x - 23)(5x - 1) = 0$$

$$x = 23 \quad x = \frac{1}{5}$$

Not possible because
 $3(\frac{1}{5}) - 9 = -8.4$
(distance cannot be negative)

$$x = 23$$

CREDITS

I use clipart and
fonts in my products



Art with a Penny



Many thanks to these
talented artists!