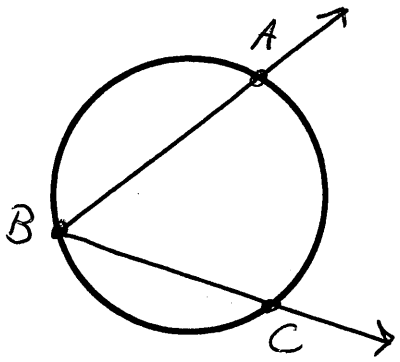
10-4 Inscribed Angles Geometry Key

What is an inscribed angle and how do you find its measure?

Remember: When naming an angle using 3 letters, the letter in the middle is the vertex!!

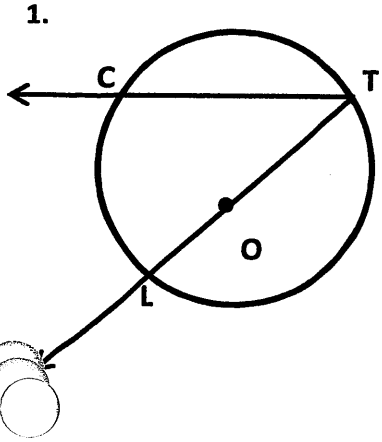
Inscribed Angle: An angle whose vertex is on the circle and whose sides are chords of the circle.

$m\angle ABC$ is an inscribed angle



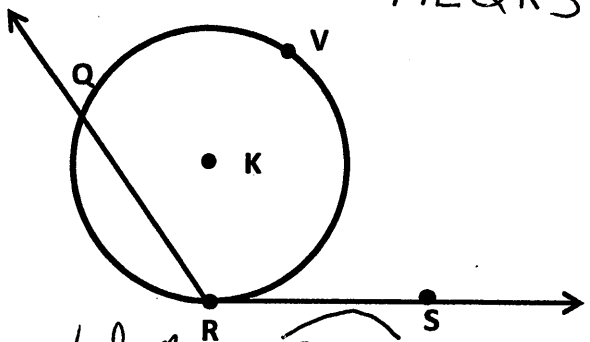
Determine whether each angle is an inscribed angle. Name the intercepted arc for the angle.

1. $m\angle CTL$



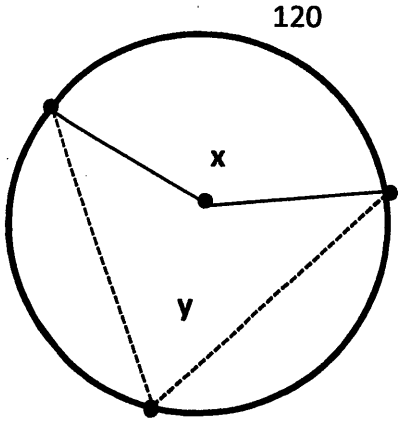
Intercepted Arc: $\overset{\frown}{CL}$

2. $m\angle QRS$



Intercepted Arc: $\overset{\frown}{QVR}$

What do we call this type of angle?



What is the value of x? 120°

How do we solve for y? $\frac{1}{2}$(Intercepted Arc)

The measure of the inscribed angle is Half the measure of the intercepted arc!!

To find the measure of the inscribed angle...

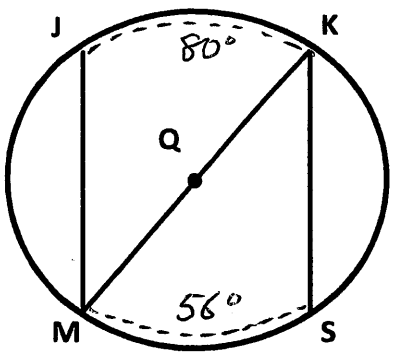
Inscribed Angle = $\frac{1}{2}$(Intercepted Arc)

$= \frac{1}{2}(120^\circ) = \boxed{60^\circ}$

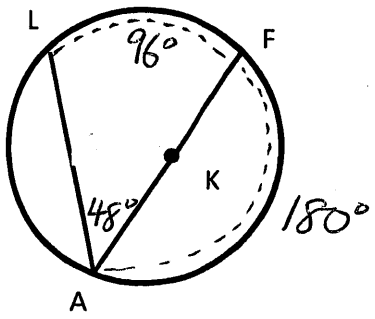
Examples:

3. If $m\overset{\frown}{JK} = 80°$, find $m\angle JMK$ $= \frac{1}{2}(80°) = 40°$

4. If m MKS= 56°, find $m\overset{\frown}{MS}$ $\frac{1}{2}(56°) = 28°$



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



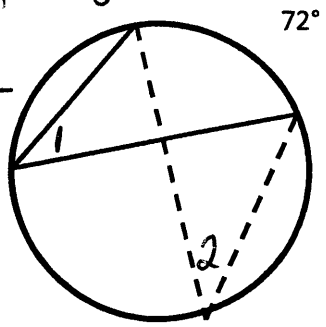
$\overset{\frown}{AL} = 360 - 96 - 180$

$= \boxed{84°}$

If two inscribed angles intercept the same arc, then they are

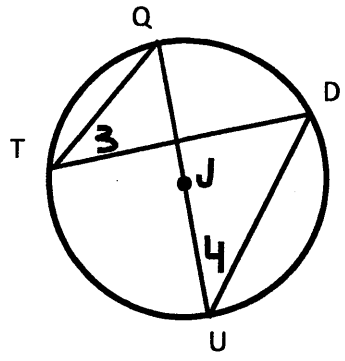
congruent.

$m\angle 1 = m\angle 2$



Example 5

In $\odot J$, $m\angle 3 = 5x$ and $m\angle 4 = 2x + 9$. Find the value of x.



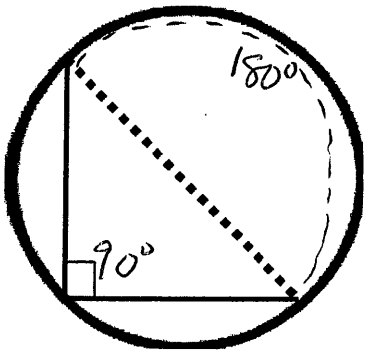
$5x = 2x + 9$

$3x = 9$ $\boxed{x = 3}$

If a right triangle is inscribed in a circle then the

hypotenuse **is the**

diameter **diameter of the circle.**



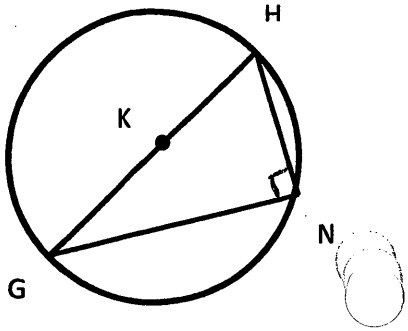
Example 6

In $\odot K$, $\overline{GH}$ is a diameter and $m\angle GNH = 4x - 14$. Find the value of x.

$4x - 14 = 90$

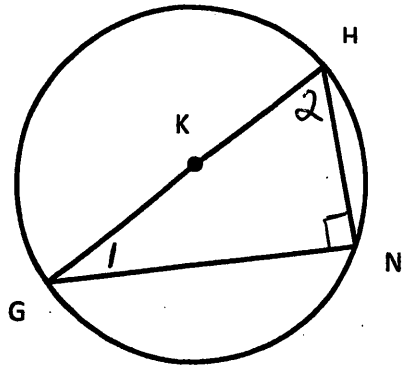
$4x = 104$

$\boxed{x = 26}$



Example 7

In ⊙K, $m\angle 1 = 6x - 5$ and $m\angle 2 = 3x - 4$. Find the value of x.



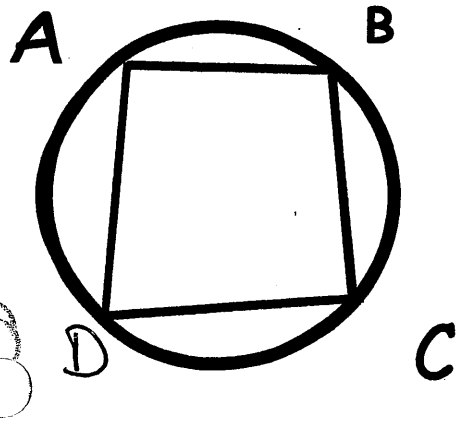
$6x - 5 + 3x - 4 + 90 = 180$

$9x + 81 = 180$

$9x = 99$

$x = 11$

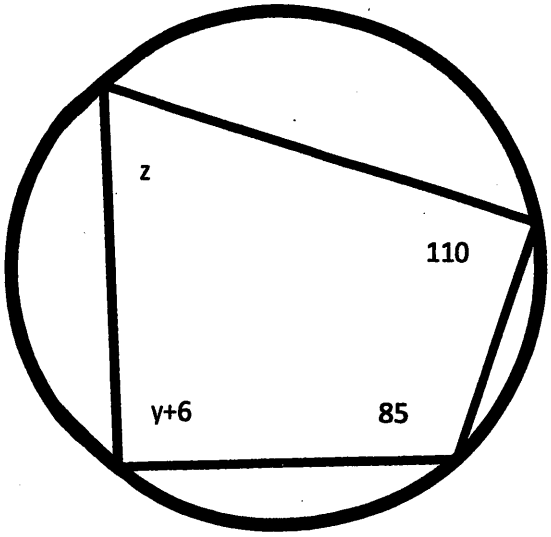
A circle can be circumscribed around a quadrilateral if and only if its opposite angles are supplementary.



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

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

Example 8: Find y and z.



$z + 85 = 180$

$z = 95^\circ$

$y + 6 + 110 = 180$

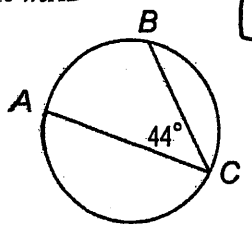
$y = 64^\circ$

NAME _____ DATE _____ PERIOD _____

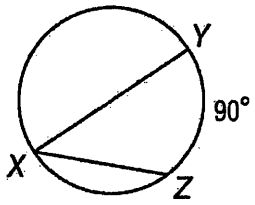
10-4 Practice
Inscribed Angles

Find each measure.

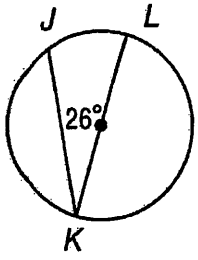
1. $m\widehat{AB}$ 88°



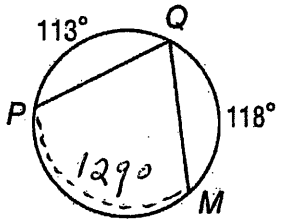
2. $m\angle X$ = 45°



3. $m\widehat{JK}$ 52°



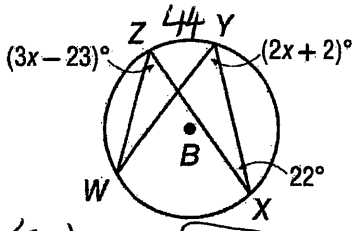
4. $m\angle Q$ = 64.5°



3x − 23 = 2x + 2
x = 25

ALGEBRA Find each measure.

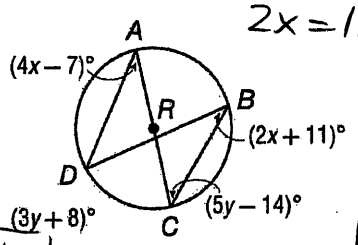
5. $m\angle W$ 44°



6. $m\angle Y$ 2(25) + 2 = 52°

4x − 7 = 2x + 11
2x = 18 x = 9

7. $m\angle A$ 4(9) − 7 = 29°



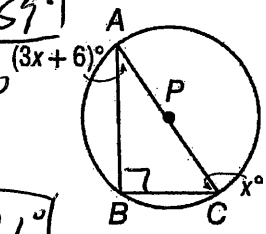
8. $m\angle D$ = 41°

(3y + 8)°

3y + 8 = 5y − 14
22 = 2y
11 = y

ALGEBRA Find each measure.

9. $m\angle A$ = 69°

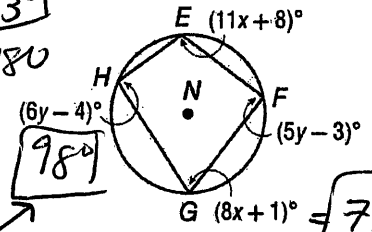


90 + 4x + 6 = 180
4x = 84
x = 21

10. $m\angle C$ 21°

11. $m\angle G$ 73°

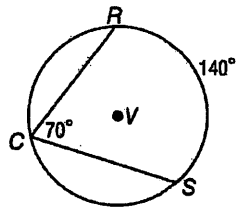
11x + 8 + 8x + 1 = 180
19x + 9 = 180
x = 9



12. $m\angle H$

11y − 7 = 180
11y = 187 y = 17

13. **PROBABILITY** In $\odot V$, point C is randomly located so that it does not coincide with points R or S. If $m\widehat{RS} = 140$, what is the probability that $m\angle RCS = 70$?



HOMEWORK Mon 11/3 p.207-208 #1-20 all

LESSON 6.4 **Exercise Set A**

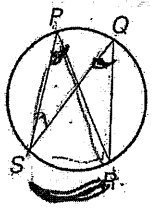
MM2G3b Understand and use properties of central, inscribed, and related angles.

MM2G3d Justify measurements and relationships in circles using geometric and algebraic properties.

1. Multiple Choice In the figure ~~shown~~, which statement is true?

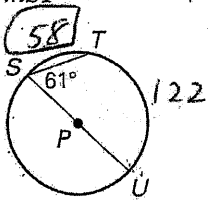
A. $\angle SPR \cong \angle PSQ$ **B.** $\angle RQS \cong \angle RPS$

C. $\angle RPS \cong \angle PRQ$ **D.** $\angle PRQ \cong \angle SQR$

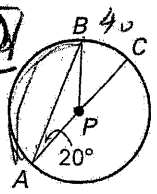


Find the measure of the indicated angle or arc in $\odot P$.

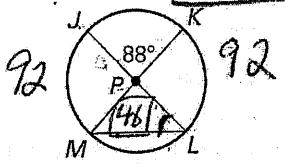
2. $m\overset{\frown}{ST}$ 58



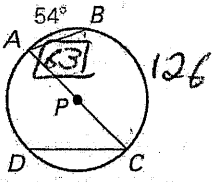
3. $m\overset{\frown}{AB}$ 140



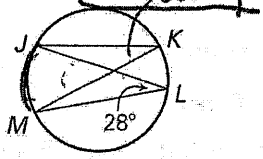
4. $m\angle JLM$ 46°



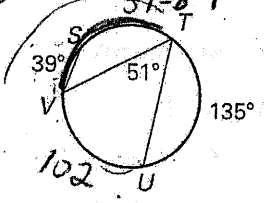
5. $m\angle A$ 63



6. $m\angle K$ $m\angle K = 28°$



7. $m\overset{\frown}{VST}$ $ST = 84$ 123°



Find the measure of the indicated angle or arc in $\odot P$, given $m\overset{\frown}{LM} = 84°$ and $m\overset{\frown}{KN} = 116°$.

8. $m\angle JKL$ 90°

9. $m\angle MKL$ 42°

10. $m\angle KMN$ 58°

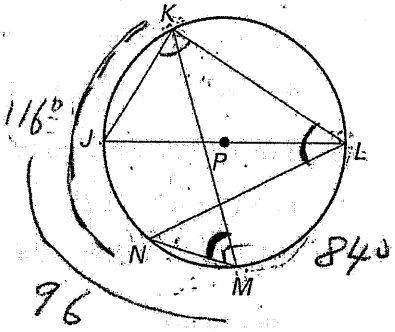
11. $m\angle JKM$ 48°

12. $m\angle KLN$ 58°

13. $m\angle LNM$ 42°

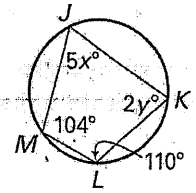
14. $m\overset{\frown}{MJ}$ 96°

15. $m\overset{\frown}{LKJ}$ 180°



In Exercises 16–18, find the values of the variables.

16.



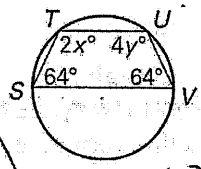
$5x + 110 = 180$

$x = 14$

$2y + 104 = 180$

$y = 38$

17.



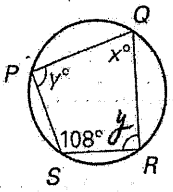
$2x + 64 = 180$

$x = 58$

$64 + 4y = 180$

$y = 29$

18.



$y = 90°$

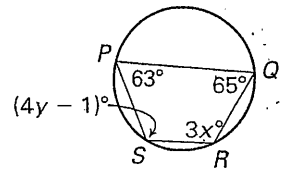
$x = 72°$

UNIT 6

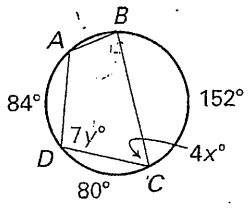
Exercise Set A *(continued)*

In Exercises 19–21, find the values of the variables.

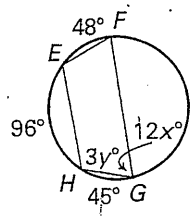
19.



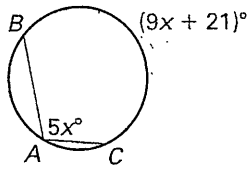
20.



21.



22. **Multiple Choice** What is the value of x in the figure shown?



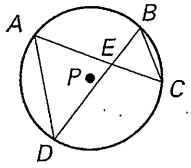
A. 7 **B.** 12

C. 16 **D.** 21

23. **Proof** Copy and complete the proof.

GIVEN: $\odot P$

PROVE: $\triangle AED \sim \triangle BEC$

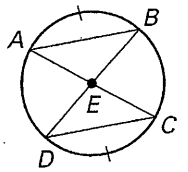


Statements	Reasons
1. $\odot P$	1. Given
2. ?	2. Vertical Angles Theorem (Two angles are vertical angles if their sides form two pairs of opposite rays. The Vertical Angles Theorem states that vertical angles are congruent.)
3. $\angle CAD \cong \angle DBC$	3. ?
4. $\triangle AED \sim \triangle BEC$	4. ?

24. **Proof** Copy and complete the proof.

GIVEN: $\overset{\frown}{AB} \cong \overset{\frown}{CD}$

PROVE: $\triangle ABE \cong \triangle DCE$



Statements	Reasons
1. $\overset{\frown}{AB} \cong \overset{\frown}{CD}$	1. ?
2. ?	2. Theorem 6.5
3. ?	3. Vertical Angles Theorem (Two angles are vertical angles if their sides form two pairs of opposite rays. The Vertical Angles Theorem states that vertical angles are congruent.)
4. $\angle BDC \cong \angle CAB$	4. ?
5. $\triangle ABE \cong \triangle DCE$	5. ?

UNIT 6