Vocabulary

● Review

Write *noun* or *verb* to identify how *intercept* is used.

1. Defense tries to *intercept* a touchdown pass.

2. The *y-intercept* of a line is the *y*-value at $x = 0$.

3. Cryptographers *intercept* and decipher code messages.

4. The *x-intercept* of a line is the *x*-value at $y = 0$.
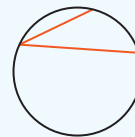
● Vocabulary Builder

inscribed (adjective) in SKRYBD

Related Word: circumscribed

Definition: *Inscribed* means written, marked, or engraved on. *Circumscribed* means encircled, confined, or limited.

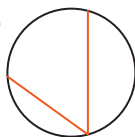**Math Usage:** An **inscribed** angle is formed by two chords with a vertex on the circle.
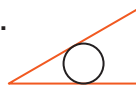
inscribed angle

● Use Your Vocabulary

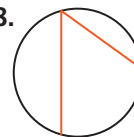**Write *circumscribed* or *inscribed* to describe each angle.**

5.

6.

7.

8.

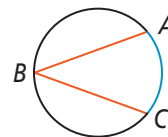**Underline the correct word to complete each sentence.**

9. ∠*ABC* with points *A*, *B*, and *C* on a circle is a(n) circumscribed / inscribed angle.

10. An intercepted arc is between the sides of a(n) circumscribed / inscribed angle.

take note

Theorem 12-11   Inscribed Angle Theorem

The measure of an **inscribed angle** is half the measure of its **intercepted arc**.

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

11. Suppose $m\,\widehat{AC} = 90$.

$m\angle B = \boxed{} \cdot m\,\widehat{AC} = \boxed{}$

12. Suppose $m\angle B = 60$.

$m\,\widehat{AC} = \boxed{} \cdot m\angle B = \boxed{}$

✓ Problem 1   Using the Inscribed Angle Theorem

Got It? In ⊙O, what is $m\angle A$?

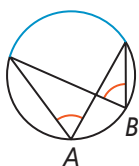**13.** Complete the reasoning model below.
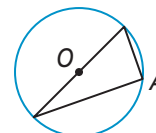
Think	Write
I know the sides of $\angle A$ are chords and the vertex is on ⊙O.	$\angle A$ is an inscribed angle.
I can use the Inscribed Angle Theorem.	$m\angle A = \frac{1}{2}$ (measure of the blue arc) $= \frac{1}{2}\,(\boxed{})$ $= \boxed{}$

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take note

Corollaries to Theorem 12-11   Inscribed Angle Theorem
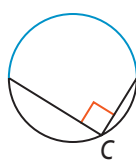
Corollary 1

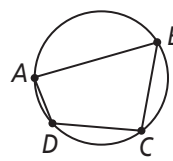Two inscribed angles that intercept the same arc are congruent.

Corollary 2

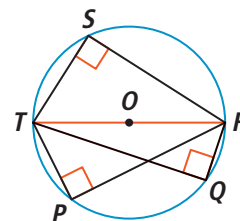An angle inscribed in a semicircle is a right angle.

Corollary 3

The opposite angles of a quadrilateral inscribed in a circle are supplementary.

Use the diagram at the right. Write T for *true* or F for *false*.
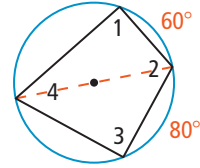

_____ **14.** $\angle P$ and $\angle Q$ intercept the same arc.

_____ **15.** $\angle SRP$ and $\angle Q$ intercept the same arc.

_____ **16.** $\widehat{TSR}$ is a semicircle.

_____ **17.** $\angle PTS$ and $\angle SRQ$ are opposite angles.

_____ **18.** $\angle PTS$ and $\angle SRP$ are supplementary angles.

Lesson 12-3

Got It? In the diagram at the right, what is the measure of each numbered angle?

19. Use the justifications at the right to complete each statement.

$m\angle 4 = \frac{1}{2}($ ⬚ $+$ ⬚ $)$ Inscribed Angle Theorem

$m\angle 4 = \frac{1}{2}($ ⬚ $)$ Add within parentheses.

$m\angle 4 =$ ⬚   Simplify.

20. Circle the corollary you can use to find $m\angle 2$.

| An angle inscribed in a semicircle is a right angle. | The opposite angles of a quadrilateral inscribed in a circle are supplementary. |

21. Now solve for $m\angle 2$.

22. Underline the correct word to complete the sentence.

The dashed line is a diameter / radius .

23. Circle the corollary you can use to find $m\angle 1$ and $m\angle 3$.

| An angle inscribed in a semicircle is a right angle. | The opposite angles of a quadrilateral inscribed in a circle are supplementary. |

Use your answer to Exercise 23 to find the angle measures.
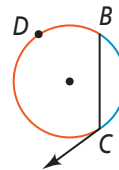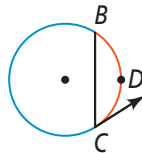
24. $m\angle 1 =$ ⬚

25. $m\angle 3 =$ ⬚

26. So, $m\angle 1 =$ ⬚ , $m\angle 2 =$ ⬚ , $m\angle 3 =$ ⬚ , and $m\angle 4 =$ ⬚ .

take note

Theorem 12-12

The measure of an angle formed by a tangent and a chord is half the measure of the intercepted arc.

$m\angle C = \frac{1}{2} m\overset{\frown}{BDC}$

27. Suppose $m\angle C = 50$.

$m\overset{\frown}{BDC} =$ ⬚ $\cdot$ $m\angle C =$ ⬚

28. Suppose $m\overset{\frown}{BDC} = 80$.

$m\angle C =$ ⬚ $\cdot$ $m\overset{\frown}{BDC} =$ ⬚

29. In the diagram at the right, $\overrightarrow{BC}$ is tangent to $\odot O$ at B.

$m\overset{\frown}{ADB} =$ ⬚ $m\angle ABC =$ ⬚
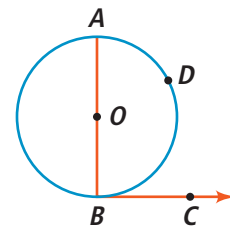
Got It? In the diagram at the right, $\overline{KJ}$ is tangent to $\odot O$. What are the values of x and y?
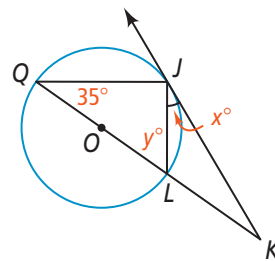
30. Circle the arc intercepted by $\angle JQL$. Underline the arc intercepted by $\angle KJL$.

$$\overset{\frown}{JL} \qquad\qquad \overset{\frown}{JQ} \qquad\qquad\qquad \overset{\frown}{QL} \qquad\qquad\qquad \overset{\frown}{QLJ}$$

31. By the Inscribed Angle Theorem, $m\overset{\frown}{JL} = \boxed{} \cdot \boxed{} = \boxed{}$.

32. By Theorem 12-12, $x = \boxed{} \cdot m\overset{\frown}{JL} = \boxed{}$.

33. The value of x is $\boxed{}$.

34. Underline the correct words to complete the sentence.

$\overline{QL}$ is a **diameter / radius** , so $\angle QJL$ is a(n) **acute / right / obtuse** angle.

35. Use the justifications at the right to complete each statement.

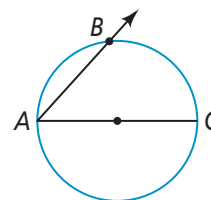|	
$m\angle QJL + m\angle JLQ + m\angle LQJ = \boxed{}$	Triangle Angle-Sum Theorem
$\boxed{} + y + \boxed{} = \boxed{}$	Substitute.
$y + \boxed{} = \boxed{}$	Simplify.
$y = \boxed{}$	Subtract from each side.

Lesson Check • Do you UNDERSTAND?

Error Analysis A classmate says that $m\angle A = 90$. What is your classmate's error?

36. Is diameter $\overline{AC}$ a side of $\angle A$?   Yes / No

37. Is $\angle A$ inscribed in a semicircle?   Yes / No

38. What is your classmate's error? Explain.

_____

_____

Math Success

Check off the vocabulary words that you understand.

☐ inscribed angle   ☐ intercepted arc

Rate how well you can _find the measure of inscribed angles_.

Need to review	0 2 4 6 8 10	Now I get it!

Lesson 12-3