

Unit 9 Circles

| Date | Target | Assignment | Done! |
|--------|-----------|---------------------|-------|
| R 2-15 | 9.1a | 9.1a Worksheet | |
| F 2-16 | | 10:40 Release | |
| T 2-20 | 9.1b | 9.1b Worksheet | |
| W 2-21 | 9.2 | 9.2 Worksheet | |
| R 2-22 | REV | 9.1-9.2 Review | |
| F 2-23 | Quiz | Quiz 9.1-9.2 | |
| M 2-26 | 9.3 | 9.3 Worksheet | |
| T 2-27 | 9.4a/9.4b | 9.4a/9.4b Worksheet | |
| W 2-28 | 9.4c | 9.4c Worksheet | |
| R 3-1 | REV | 9.3-9.4 Review | |
| F 3-2 | Quiz | Quiz 9.3-9.4 | |
| M 3-5 | 9.5 | 9.5 Worksheet | |
| T 3-6 | Quiz | Review/Quiz 9.5 | |
| W 3-7 | REV | Unit 9 Test Review | |
| R 3-8 | REV | Unit 9 Test Review | |
| F 3-9 | Test | Unit 9 Test | |
| M 3-12 | Test | Unit 9 Test | |

Target 1 – Understand, identify and apply basic facts of a circle

Target 2 – Understand and apply information about angles formed inside of a circle

Target 3 – Understand and apply information about angles formed inside of a circle

Target 4 – Identify and apply angle relationships of segments formed by tangents, chords, and secants to find unknown lengths

Target 5 – Write and apply information about the equation of a circle

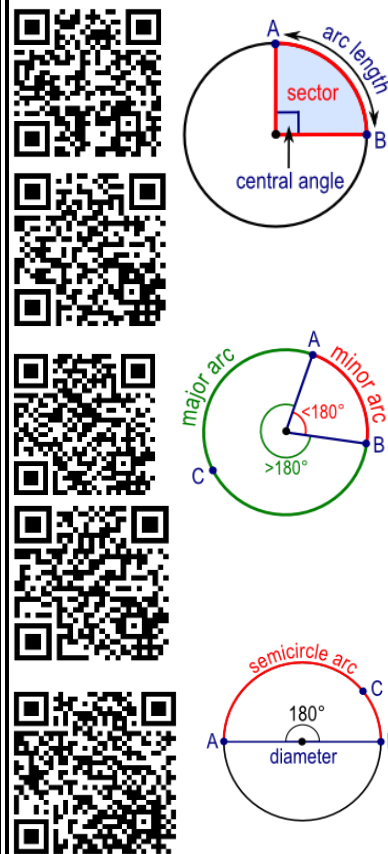
Name: _____

9.1 – Circle Facts Day 1**Target 1 – Understand, identify, and apply basic facts of a circle**

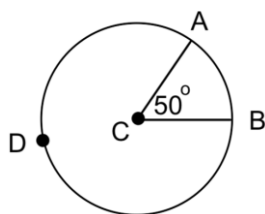
| Vocabulary | Definition |
|-------------------|-------------------|
| Circle | |
| Radius | |
| Diameter | |
| Circumference | |

Annotate Here

| Vocabulary | Definition |
|-------------------|-------------------|
| Central Angle | |
| Arc Measure | |
| Minor Arc | <i>Notation</i> |
| Major Arc | <i>Notation</i> |
| Semicircle | |

Annotate Here**Facts of Measuring Arcs**

- 1) The measure of the entire circle is _____.
- 2) The measure of the major arc is the difference between _____ and the measure of the related minor arc.
- 3) The measure of a semicircle is _____.



Arc Addition Postulate

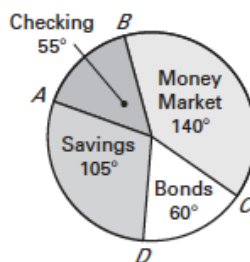
The measure of an arc formed by two adjacent arcs is the _____ of the measure of the two arcs.

Example 1: Find Arc Measures

You may join a new bank and divide your money several ways, as shown in the circle. Find the indicated arc measures

A) Find $m\widehat{BD}$

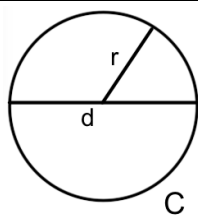
B) Find $m\widehat{BCD}$



Circumference of a Circle

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

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



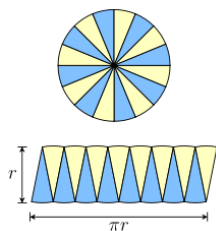
Example 2: Solve problems involving circumference

Find the indicated measure

A) Circumference of a circle with radius 11 meters.

B) Radius of a circle with circumference 18 yards.

Area of a Circle



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

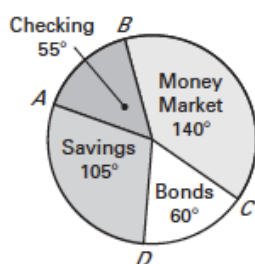
Annotate Here

Example 3: Solve problems involving area

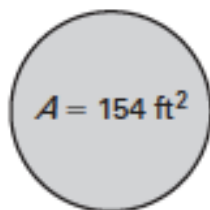
Find the indicated measure.

A) Area of the face of the watch
 $r = 4.2$ cmB) Diameter of the CD
 $A = 201$ cm²**YOU TRY NOW!**

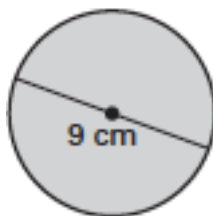
1. Find the indicated arc measure.

a) $m\widehat{CD}$ b) $m\widehat{ADC}$ 

2) Find the radius.



3) Find the area and the circumference.

**Annotate Here**

1a. 60°
 1b. 165°
 2. 7 ft
 3. $A = 63.62$ ft², 20.25π ft²; $C = 9\pi$ cm; 28.27 cm

YOU TRY NOW

9.1 Day 2– Arc Length and Sectors**Target 1 – Understand, identify, and apply basic facts of a circle****Arc Length Corollary****Vocabulary**

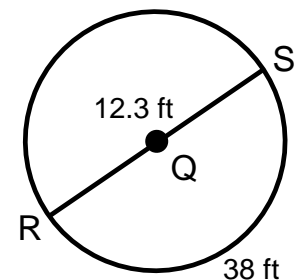
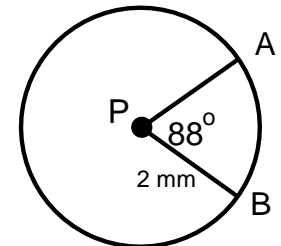
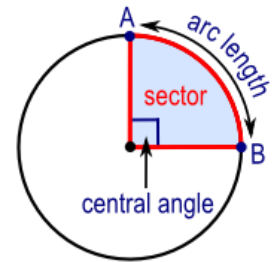
Arc Length -



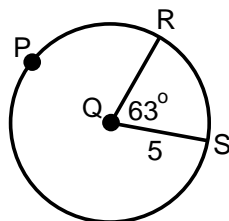
In a circle, the ratio of the length of a given arc TO the circumference is equal to the ratio of the measure of the arc TO 360 degrees.

Example 1: Find and use Arc Lengths

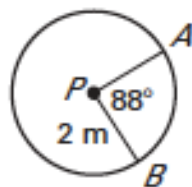
Use the diagram to find the indicated measure

1. Arc Length of \widehat{AB} 2. Arc Measure of \widehat{RS} **Annotate Here****Area of a Sector****Vocab**Sector of a Circle

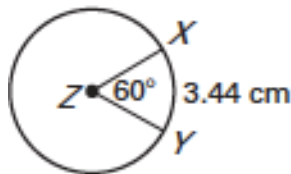
The ratio of a sector of a circle TO the area of the whole circle is equal to the ratio of the measure of the intercepted arc to 360 degrees.

Example 2: Find the area of sectorsFind the areas of the sectors formed by $\angle RQS$.**YOU TRY NOW!**

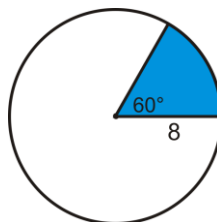
Find the indicated measure.

1. Arc length of \widehat{AB} 

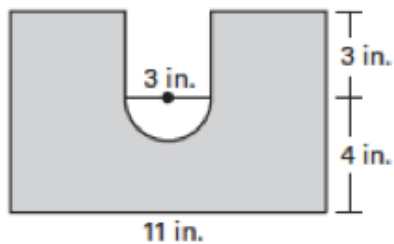
2) Find the radius.



3) Area of the shaded sector



4) BONUS EXTRA Find the perimeter of the shaded region

**Annotate Here**

You Try Now
 1. $3.072\text{ m}; \frac{45}{14}\pi\text{ m}$
 2. 3.28 cm
 3. $33.51\text{ units}^2; \frac{3}{32}\pi\text{ units}^2$
 4. BONUS: 43.71 in

9.2– Angles Formed Inside of a Circle**Target 2 – Understand and apply information about angles formed inside of a circle****Vocabulary**

Tangent: _____

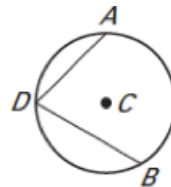
Chord: _____

Inscribed angle: _____

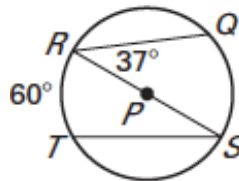
Intercepted arc: _____

Measure of an Inscribed Angle and Polygons

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

**Example 1: Use inscribed angles.**

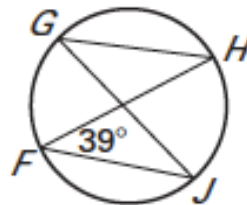
Find the indicated measure in Circle P.

a) $m\angle S$ b) $m\widehat{RQ}$ **Inscribed Angles, Same Intercepted Arc**

If two inscribed angles of a circle intercept the same arc, then the angles are _____.

Example 2: Find the measure of an intercepted arc

Find $m\angle HGJ$ and $m\widehat{HJ}$. What do you notice about $m\angle HGJ$ and $m\angle HFJ$?

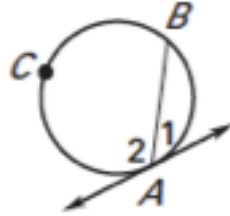
**Annotate Here****Relationship #1**

Chord/Chord –
Intercepted Arc

What do you notice about $\angle HGJ$ and $\angle HFJ$?

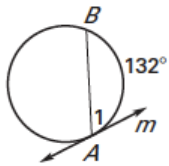
Intersection of a Tangent and a Chord

If a tangent and a chord intersect at a point on a circle, then the measure of each angle formed is _____ the measure of its intercepted arc.

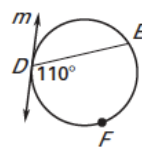
**Example 3: Find an angle or arc measures**

Line m is tangent to the circle. Find the indicated measure.

a) $m\angle 1$



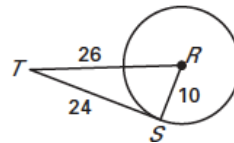
b) $m\widehat{EFD}$

**Intersection of a Tangent and Radius**

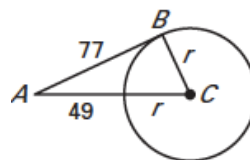
In a plane, a line is tangent to a circle if and only if the line is _____ to a radius or diameter of the circle at its end point on the circle

**Example 4: Verify a tangent to a circle**

In the diagram, \overline{RS} is a radius of Circle R. Is \overline{ST} tangent to Circle R?

**Example 5: Find the radius of a circle**

In the diagram, B is a point of tangency. Find the radius r of Circle C.

**Annotate Here****Relationship #2**

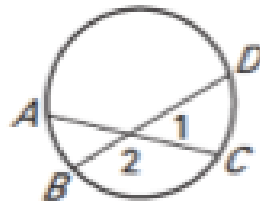
Tangent/Chord – Intercepted Arc

Relationship #3

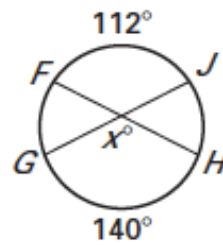
Tangent/Radius/Diameter – Right Angle

Angles Inside the Circle Theorem

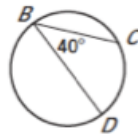
If two chords intersect _____ a circle, then the measure of each angle is _____ the sum of the measure of the arcs intercepted by the angle and it's vertical angle.

**Example 6: Find an angle measure inside a circle**

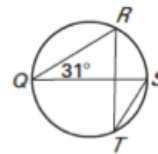
Find the value of x . The cord \overline{FH} and \overline{GJ} intersect the inside the circle.

**YOU TRY NOW!**

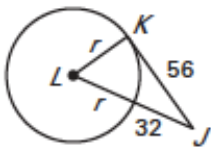
1. Find $m\angle C\hat{D}$.



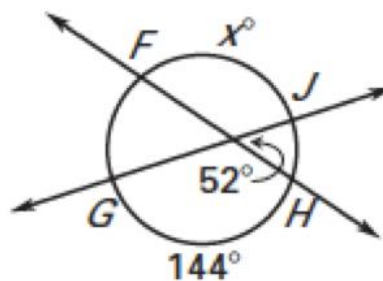
2. Find $m\angle RTS$.



3. In the diagram, K is a point of tangency. Find the radius r of Circle L .



4. Find the value of x .

**Annotate Here**

Relationship #4
Chord/Chord – Arc Measures

9.3– Angles Formed Outside of a Circle

Target 3 – Understand and apply information about angles formed outside of a circle

Angles Outside the Circle Theorem

If a tangent and a secant, two tangents, or two secants _____ outside a circle, then the measure of the angle formed is _____ the _____ of the measures of the intercepted arcs.

Secant/Secant

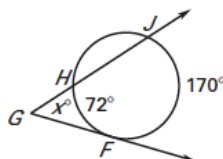
Tangent/Tangent

Tangent/Secant

Annotate Here

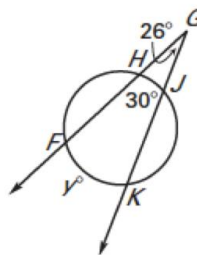
Example 1: Find an angle measure outside a circle

Find the value of x . The tangent \overline{GF} and the secant \overline{GJ} intersect outside the circle.

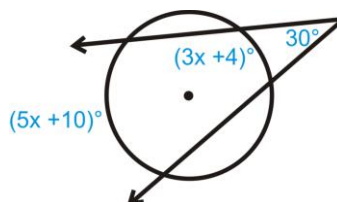


YOU TRY NOW!

1. Find the indicated measure or the value of the variable.



2. Find the value of x .

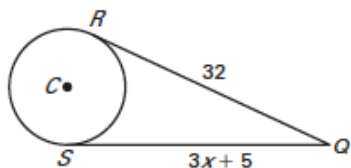


9.4a – Properties of Tangents

Target 4 – Understand and apply relationships of segments formed by tangents, chords, and secants to find unknown lengths

Intersection of Tangent Segments Outside the Circle

Tangent segments from a common external point are _____.

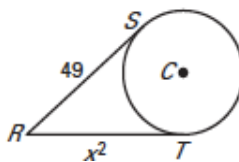


Example 1: Applying the Property

\overline{QR} is tangent to Circle C at R and \overline{QS} is tangent to Circle C at S. Find the value of x.

YOU TRY NOW!

1. \overline{RS} is tangent to Circle C at S and \overline{RT} is tangent to Circle C at T. Find the value of x.



Annotate Here

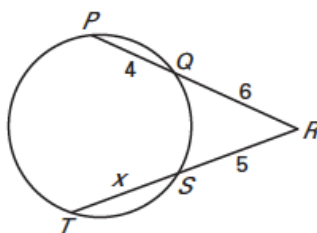
9.4b – Properties of Secants

Target 4 – Understand and apply relationships of segments formed by tangents, chords, and secants to find unknown lengths

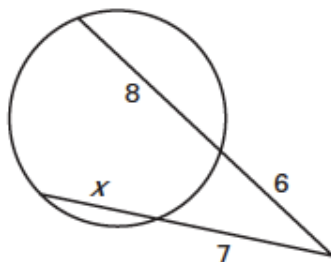
Segments of Secants Theorem

If two _____ share the same endpoint outside a circle, then the products of the lengths of _____ secant segment and its external segments equals the product of the lengths of the other secant segment and its external segment.

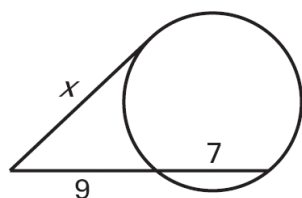
Example 1: Find the value of RT .

**YOU TRY NOW!**

1. Find the length of both secants.



2. Find the length of both secants.



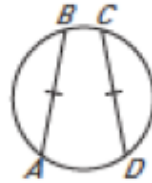
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9.4c– Properties of Chords

Target 4 – Understand and apply relationships of segments formed by tangents, chords, and secants to find unknown lengths

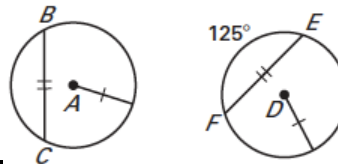
Congruency in Minor Arcs Using Corresponding Chords

In the same circle, or in congruent circles,
 _____ are congruent if
 And only if their corresponding chords are
 congruent.



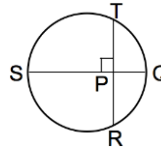
Example 1: Use congruent chords to find an arc measures

In the diagram, Circle A is congruent to Circle D, $\overline{BC} \cong \overline{EF}$,
 and $m\widehat{EF} = 125^\circ$. Find $m\widehat{BC}$



Properties of Chords and its Diameter

If one chord is a perpendicular _____ of
 another chord, then the FIRST chord is a
 _____.



CONVERSE

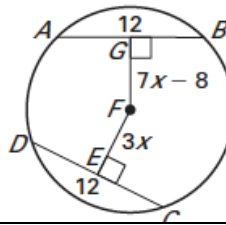
If a diameter of a circle is perpendicular to a chord, then the
 diameter
 _____ the chord and its arc.

Congruent Chords

In the same circle, or in congruent circles, two chords are
 _____ if and only if they are _____
 from the center.

Example 3: Use the property of congruent chords

In the diagram of Circle F, $AB = CD = 12$. Find EF



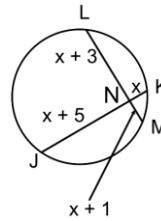
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Segments of Chords Theorem

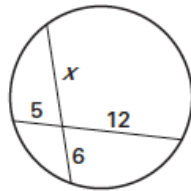
If two chords intersect in the interior of a circle, then the _____ of the lengths of the segments of one chord is _____ to the product of the lengths of the segments of the other chord.

Example 2: Identify special segments and lines

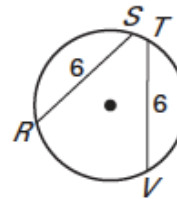
Find the length of ML and JK.

**Annotate Here****YOU TRY NOW!**

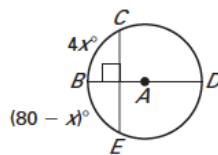
1. Use the diagram of circle to the lengths of both chords



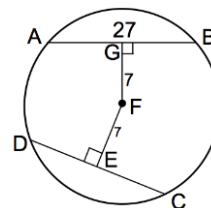
2. If $m\widehat{TV} = 121^\circ$, find $m\widehat{RS}$.



3. Find the measures of \widehat{CB} , \widehat{BE} , and \widehat{CDE} .



4. Suppose $AB = 27$ and $EF = GF = 7$. Find CD . Then, explain how you know!



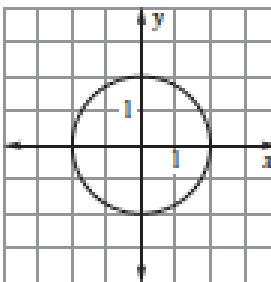
- YOU TRY NOW!**
- 10
 - 121°
 - $\widehat{CB} = \widehat{BE} = 64^\circ$; $\widehat{CDE} = 232^\circ$
 - 27; because AB and DC are equidistant to the center F, we know that both chords are congruent

9.5 – Write Equations of Circles**Target 5 – Write and apply information about the equation of a circle****Standard Equation of a Circle**

The standard equation of a circle with a center _____ and radius _____ is:

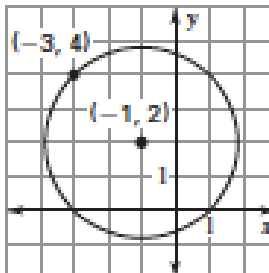
Example 1: Write an equation of a circle

Write the equation of the circle shown

**Example 2: Write the standard equation of a circle**

The point $(-3, 4)$ is on a circle with center $(-1, 2)$. Write the standard equation of the circle

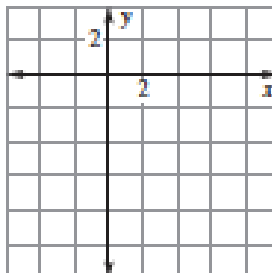
Step 1: Find the radius using the Pythagorean Theorem



Step 2: Write the standard equation of the circle

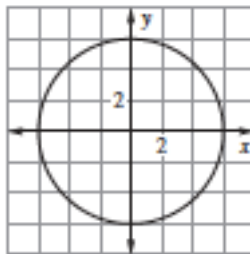
Example 3: Graph a Circle

The equation of the circle is $(x - 2)^2 + (y + 3)^2 = 16$. Graph the circle.

**Annotate Here**

YOU TRY NOW

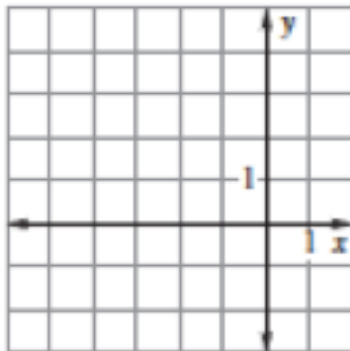
1) Write the equation of the circle shown.



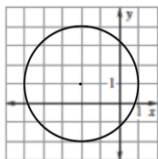
2) Write the standard equation of a circle with center $(0, -5)$ and radius 3.7.

3) The point $(-1, 2)$ is on a circle with center $(3, -3)$. Write the standard equation of the circle.

4). The equation of a circle is $(x + 2)^2 + (y - 1)^2 = 9$. Graph the circle.

**YouTryNow**

1. $x^2 + y^2 = 36$
2. $x^2 + (y + 5)^2 = 13.69$
3. $(x - 3)^2 + (y + 3)^2 = 41$
- 4.



Annotate Here