

Module 15a: A Line Tangent to a Circle

Math Practice(s):

- Construct viable arguments & critique the reasoning of others.
- Look for & make use of structure.

Learning Target(s):

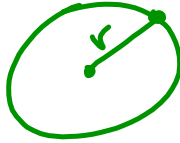
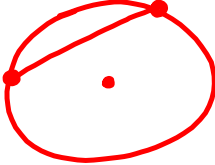

- Understand & apply the relationship between a line that is tangent to a circle & the radius of the circle at the point of tangency.

Homework:

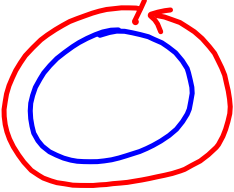

HW#3: 15a #1-7

Warm-up

1. Complete the chart below by providing a definition (or explanation) and a sketch of each geometric idea listed. (erase to show)

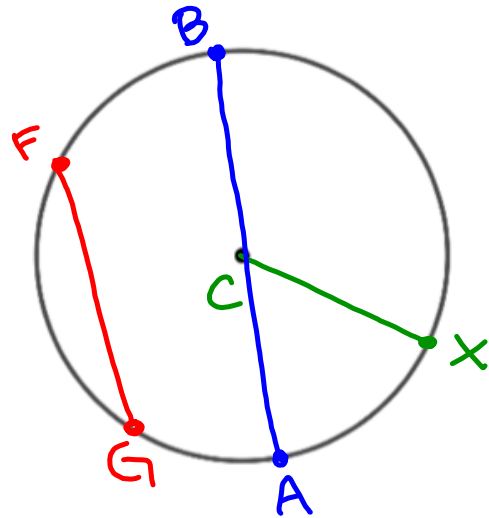
	Definition/Explanation of what it means	Sketch of what it looks like
Radius <i>r</i>	A segment from the center to any point on the circle; half diameter	
Chord	A _____ segment whose _____ endpoints _____ both lie _____ on _____ the circle.	
Diameter <i>d</i>	A segment from one side of circle to the other through center	

2. Complete the chart below by providing a definition (or explanation), a sketch and the formula for each geometric idea listed.

	Definition/Explanation of what it means	Sketch of what it looks like	Formula
Circumference <i>C</i>	The distance around a circle		$C = d\pi$ $C = 2\pi r$
Area <i>A</i>	The inside of the circle		$A = \pi r^2$

3. Refer to the circle shown to the right to answer the following questions.

- A. Label the center, C .
- B. Draw a radius. Mark its endpoint on the circle and label this point X .
- C. Draw a diameter (that does not include point X) and label its endpoints A and B .
- D. Draw a chord that is not a diameter, and label its endpoints F and G .
- E. Given $CX = 3$ cm, determine the **circumference** and **area** of the circle. For each measurement, express your answer in exact form AND its approximate value using $\pi \approx 3.14$



$$\begin{aligned}
 A &= \pi(3)^2 & A &= 9(3.14) & C &= 2\pi(3) \\
 A &= \pi(9) & A &\approx 28.26 \text{ cm}^2 & C &= 6\pi \text{ cm} \\
 A &= 9\pi \text{ cm}^2 & & & C &\approx 18.84 \text{ cm}
 \end{aligned}$$

F. If the circle is dilated about its center by a scale factor of 3 (the radius, CX , triples), determine the **circumference** and **area** of the resulting circle. For each measurement, express your answer in exact form only.

$$\begin{aligned}
 r &= 9 \text{ cm} & A &= 81\pi \text{ cm}^2 \\
 C &= 18\pi \text{ cm}
 \end{aligned}$$

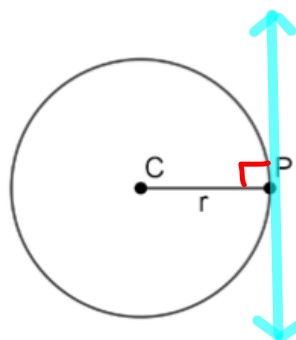
(erase to show)

A Line TANGENT to a Circle (#VOC)

A line that lies in the same plane as a circle and intersects the circle at a single point is said to be **tangent to the circle**.

The point at which the line intersects the circle is called the point of tangency.

If a line is tangent to a circle, then it is perpendicular to the radius containing the point of tangency. (#THM)



Practice

1. Refer to circle O (shown to the left) to answer the following questions.

A. Circle all of the following segments that are radii of circle O.

\overline{OM} \overline{MN} \overline{OL} \overline{LN} \overline{PN} \overline{OP}

B. Determine if each of the following statements is true or false.

- \overline{LN} is a diameter of circle O: True or **False**
- \overline{PN} is a diameter of circle O: True or **False**
- \overline{OM} is a diameter of circle O: True or **False**

C. Name all of the chords shown in circle O.

\overline{MN} , \overline{NL} , \overline{NP}

D. Draw line r on the diagram so that it is tangent to circle O at point L.

E. What can you conclude about the relationship between line r and \overline{LO} ?

line $r \perp \overline{LO}$

F. Draw line h on the diagram so that it is tangent to circle O at point M.

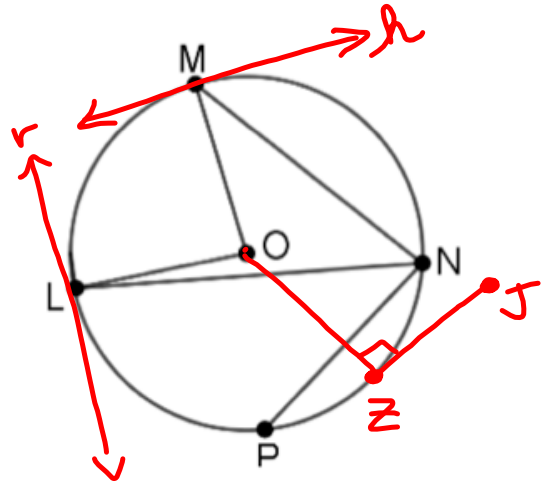
G. What can you conclude about the relationship between line h and \overline{MO} ?

line $h \perp \overline{MO}$

H. Mark point Z somewhere on circle O and draw radius \overline{OZ} . Then, draw \overline{JZ} so that it is tangent to circle O at point Z.

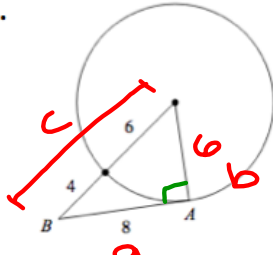
I. What is the measure of $\angle JZO$?

90°



Determine if \overline{AB} is tangent to the circle.

2.



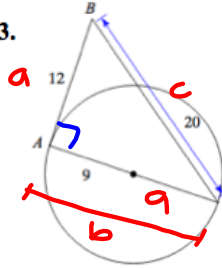
$$8^2 + 6^2 = 10^2$$

$$64 + 36 = 100$$

$$100 = 100$$

\overline{AB} is tangent to the circle.

3.



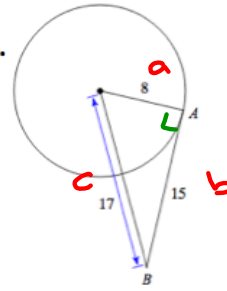
$$12^2 + 18^2 = 20^2$$

$$144 + 324 = 400$$

$$468 = 400$$

\overline{AB} is not tangent.

4.



$$8^2 + 15^2 = 17^2$$

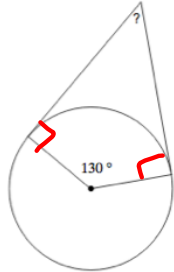
$$64 + 225 = 289$$

$$289 = 289$$

\overline{AB} is tangent.

Find the measure of the indicated angle. Lines which appear to be tangent are tangent.

5.



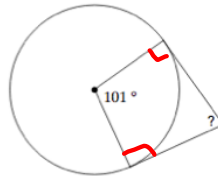
$$130 + 90 + 90 + ? = 360$$

$$310 + ? = 360$$

$$? = 50$$

$$50^\circ$$

6.



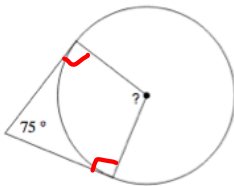
$$101 + 90 + 90 + ? = 360$$

$$281 + ? = 360$$

$$? = 79$$

$$79^\circ$$

7.



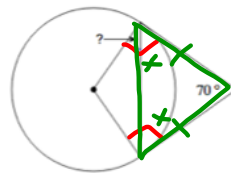
$$75 + 90 + 90 + ? = 360$$

$$255 + ? = 360$$

$$? = 105$$

$$105^\circ$$

8.



$$x + x + 70 = 180$$

$$2x = 110$$

$$x = 55^\circ$$

$$x + ? = 90$$

$$55 + ? = 90$$

$$? = 35$$

$$35^\circ$$