

# Lesson 6.1: Tangent Properties

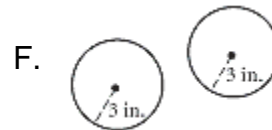
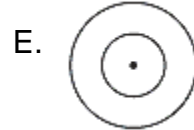
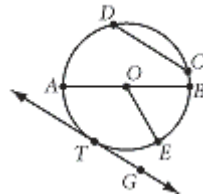
In this lesson you will:

- review terms associated with circles
- discover how a tangent to a circle and the radius to the point of tangency are related
- make a conjecture about tangent segments to a circle from a point outside the circle

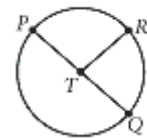
Let's review some basic terms from Chapter 1 before you begin discovering the properties of circles. Match the figures at the right with terms at the left.

1. \_\_\_\_\_ congruent circles
2. \_\_\_\_\_ concentric circles
3. \_\_\_\_\_ radius
4. \_\_\_\_\_ chord
5. \_\_\_\_\_ diameter
6. \_\_\_\_\_ tangent
7. \_\_\_\_\_ central angle
8. \_\_\_\_\_ minor arc
9. \_\_\_\_\_ major arc
10. \_\_\_\_\_ semicircle

- A.  $\overline{DC}$       C.  $\overline{OE}$   
 B.  $\overline{TG}$       D.  $\overline{AB}$

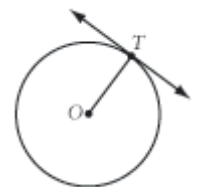


- G.  $\square RQ$       I.  $\square PRQ$   
 H.  $\square PQR$       J.  $\angle PTR$



### Investigation 6.1.1: "Going Off on a Tangent"

- A.) Construct a large circle (with a radius of at least 1.5 inches). Label the center  $O$ .
- B.) Using your straightedge, draw a line that appears to touch the circle at only one point. Label the point  $T$ . Construct  $\overline{OT}$ .
- C.) Use your protractor to measure the angles at  $T$ . The angles are \_\_\_\_\_°. Check with the other members of your group. Did they get the same angles? \_\_\_\_\_ What can you conclude about the radius  $\overline{OT}$  and the tangent at  $T$ ?

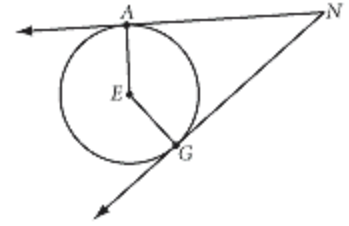


D.) Based on your observations, complete the conjecture, and add it to your conjecture list.

### Tangent Conjecture (C-53)

A tangent to a circle is \_\_\_\_\_ to the radius drawn to the point of tangency.

- E.) Construct a new circle. Label the center  $E$ .  
 F.) Choose a point outside the circle and label it  $N$ .  
 G.) Draw two lines through point  $N$  tangent to the circle. Mark the points where these lines appear to touch the circle and label them  $A$  and  $G$ .  
 H.) Use your compass to compare segments  $NA$  and  $NG$ .  
 Segments such as these are called tangent segments. What is the relationship between the measures of  $NA$  and  $NG$ ?

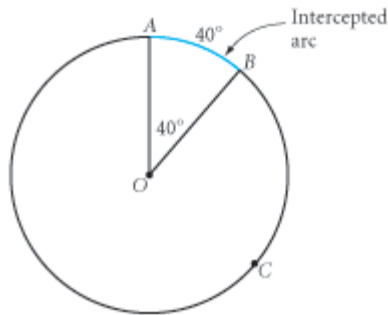


- I.) Based on your observations, complete the conjecture, and add it your conjecture list.

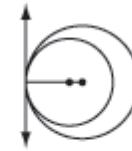
**Tangent Segments Conjecture (C-54)**

Tangent segments to a circle from a point outside the circle are \_\_\_\_\_.

- \* Add “tangent segment,” “intercepted arc,” and “tangent circles” to your vocabulary list.

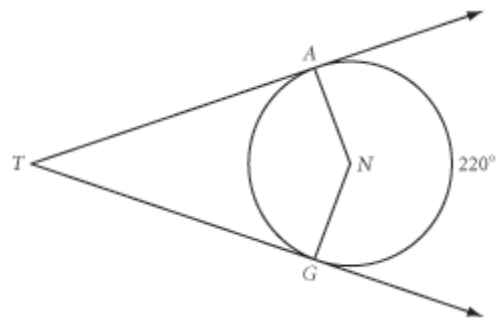


Externally tangent circles



Internally tangent circles

- Example 1: In the figure at right,  $\overrightarrow{TA}$  and  $\overrightarrow{TG}$  are both tangent to circle  $N$ . If the major arc formed by the two tangents measures  $220^\circ$ , find the measure of  $\angle T$ .



•Example 2:  $\overline{MN}$  and  $\overline{MP}$  are tangents to circle O.

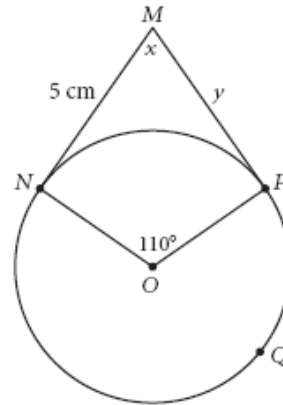
$x =$  \_\_\_\_\_

$y =$  \_\_\_\_\_

$m\angle NP =$  \_\_\_\_\_

$m\angle PQN =$  \_\_\_\_\_

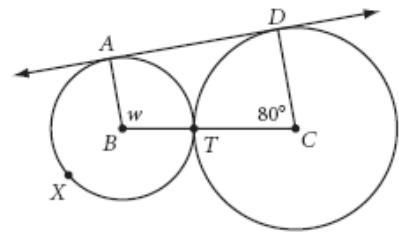
What type of quadrilateral is MNOP? \_\_\_\_\_



•Example 3:  $\overline{AD}$  is tangent to both circle B and circle C.

$w =$  \_\_\_\_\_

$m\angle AXT =$  \_\_\_\_\_



⇒ASSIGNMENT: \_\_\_\_\_