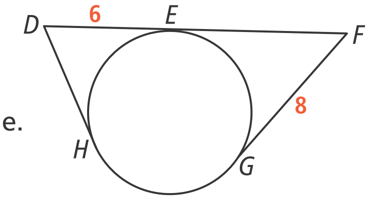
Scan for Multimedia

Practice Tutorial

Additional Exercises Available Online

UNDERSTAND

11. Error Analysis Segments $\overline{DF}$, $\overline{DH}$, and $\overline{GF}$ are tangent to the circle. Andrew was asked to find DF. Explain Andrew's error.

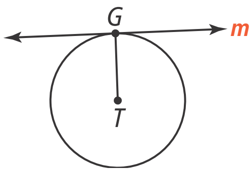


$DF = DE + EF$
By Theorem 10-2, $DE = EF$.
So, $DF = 6 + 6 = 12$. ✗

12. Construct Arguments Use the following outline to write an indirect proof of Theorem 10-1.

Given: Line m is tangent to ⊙T at G.

Prove: $\overline{GT} \perp m$

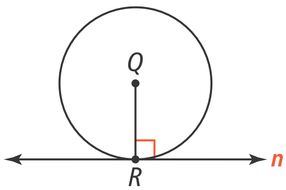


- Assume that $\overline{GT}$ is not perpendicular to m.
- Draw $\overline{HT}$ such that $\overline{HT} \perp m$.
- Use triangles to show that $GT > HT$.
- Show that this is a contradiction, since H is in the exterior of ⊙T.

13. Construct Arguments Prove the Converse of Theorem 10-1.

Given: $\overline{QR} \perp n$

Prove: n is tangent to ⊙Q at R

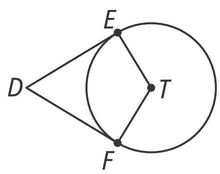


Hint: Select any other point S on line n. Show that $\overline{QS}$ is the hypotenuse of △QRS, so $QS > QR$ and therefore S lies outside ⊙Q.

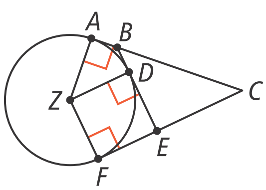
14. Construct Arguments Prove Theorem 10-2.

Given: $\overline{DE}$ and $\overline{DF}$ are tangent to ⊙T.

Prove: $\overline{DE} \cong \overline{DF}$



15. Higher Order Thinking If $AC = x$, what is the perimeter of △BCE? Explain.

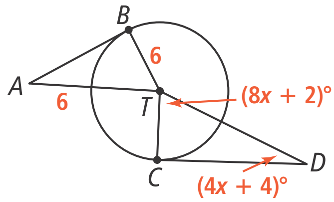


PRACTICE

The segments $\overline{AB}$ and $\overline{CD}$ are tangent to ⊙T. Find each value. SEE EXAMPLES 1 AND 2

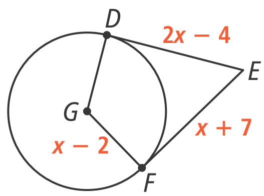
16. AB

17. $m\angle TDC$

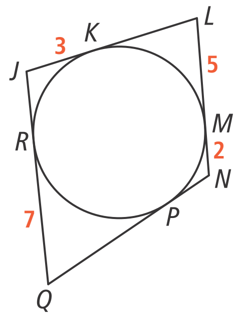


For Exercises 18–20, the segments are tangent to the circle. Find each value. SEE EXAMPLES 3 AND 4

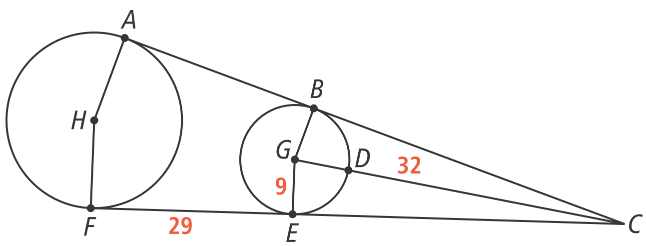
18. DG



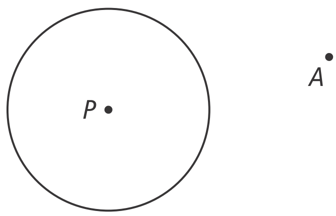
19. Perimeter of $JLNQ$



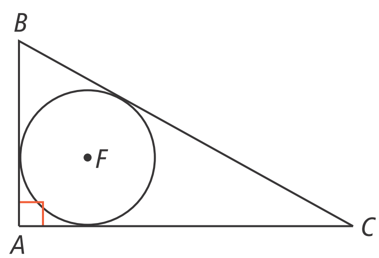
20. AC



21. Trace ⊙P and point A. Construct a tangent to ⊙P that passes through A. SEE EXAMPLE 5



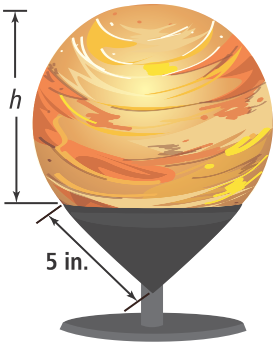
22. The diameter of ⊙F is 8; $AB = 10$; and $\overline{AB}$, $\overline{BC}$, and $\overline{AC}$ are tangent to ⊙F. What is the perimeter of △ABC?



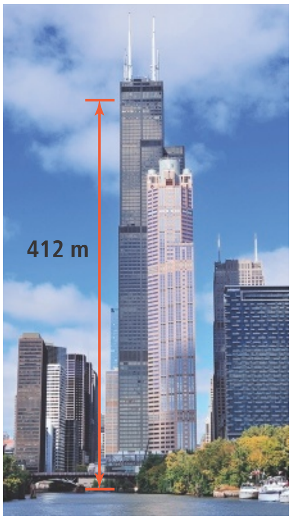
PRACTICE & PROBLEM SOLVING

APPLY

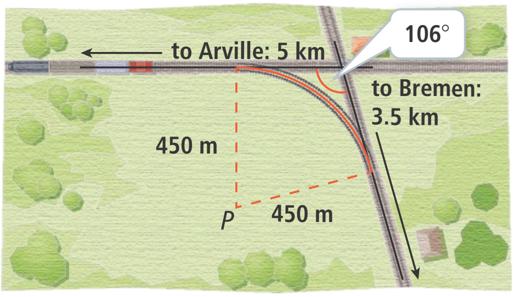
23. **Make Sense and Persevere** Yumiko is shopping for a stand for a decorative glass ball with an 8-inch diameter. She is considering the stand shown and wants to know the height h of the portion of the ball that will be visible if the sides of the stand are tangent to the sphere. What is the value of h?



24. **Use Structure** Samantha is looking out from the 103rd floor of the Willis Tower on a clear day. How far away is the horizon? Earth's radius is about 6,400 km.



25. **Mathematical Connections** Rail planners want to connect the two straight tracks with a curved track as shown. Any curves must have a radius of at least 450 m.



a. Explain how engineers can locate point P, the center of the curved section of track.

b. Once the curved track is constructed, what distance will trains travel between Arvllle and Bremen? Justify your answer.

ASSESSMENT PRACTICE

26. Circle P is described by the equation $(x + 3)^2 + (y - 2)^2 = 25$. Which of the following lines are tangent to $\odot P$? Select all that apply.

Ⓐ $y = x + 3$

Ⓑ $y = 5$

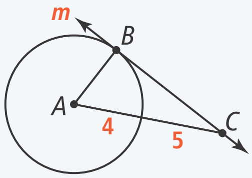
Ⓒ $y = x$

Ⓓ $x = 2$

Ⓔ $y = -3$

Ⓕ $y = x - 3$

27. **SAT/ACT** Line m is tangent to $\odot A$ at B. What is the area of $\triangle ABC$?



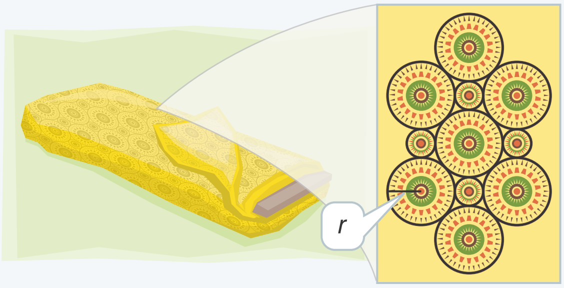
Ⓐ 10

Ⓑ 18

Ⓒ $2\sqrt{65}$

Ⓓ $\frac{5\sqrt{65}}{2}$

28. **Performance Task** The African art design below is based on circles that are tangent to each other.



Part A If the radius of the larger circles is r, what is the radius of the smaller circles?

Part B Choose a value for the larger radius and draw the pattern. Measure the radii of the small and large circles. Are the values related in the way you described in Part A?

Part C In your diagram for Part B, mark the points where the small and large circles are tangent to each other. Add lines that are tangent to the circles at these points. Describe how the tangent lines you drew illustrate Theorems 10-1 and 10-2.