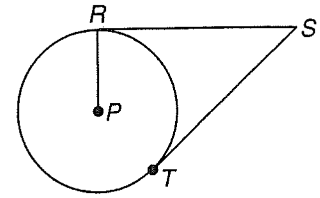
10-5 Study Guide and Intervention *(continued)*

Tangents

Tangents A tangent to a circle intersects the circle in exactly one point, called the **point of tangency**. There are three important relationships involving tangents.

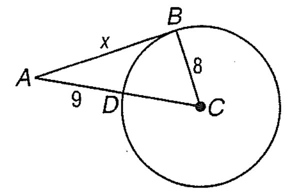
- If a line is tangent to a circle, then it is perpendicular to the radius drawn to the point of tangency.
- If a line is perpendicular to a radius of a circle at its endpoint on the circle, then the line is a tangent to the circle.
- If two segments from the same exterior point are tangent to a circle, then they are congruent.



$\overline{RP} \perp \overline{SR}$ if and only if $\overline{SR}$ is tangent to $\odot P$.

If $\overline{SR}$ and $\overline{ST}$ are tangent to $\odot P$, then $\overline{SR} \cong \overline{ST}$.

Example $\overline{AB}$ **is tangent to** $\odot C$**. Find** x**.**



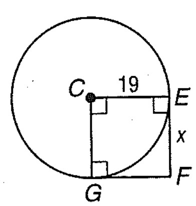
$\overline{AB}$ is tangent to $\odot C$, so $\overline{AB}$ is perpendicular to radius $\overline{BC}$. $\overline{CD}$ is a radius, so $CD = 8$ and $AC = 9 + 8$ or 17. Use the Pythagorean Theorem with right $\triangle ABC$.

$(AB)^2 + (BC)^2 = (AC)^2$	Pythagorean Theorem
$x^2 + 8^2 = 17^2$	Substitution
$x^2 + 64 = 289$	Multiply.
$x^2 = 225$	Subtract 64 from each side.
$x = 15$	Take the positive square root of each side.

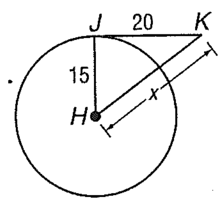
Exercises

Find x**. Assume that segments that appear to be tangent are tangent.**

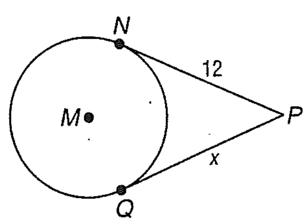
1.



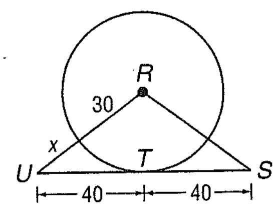
2.



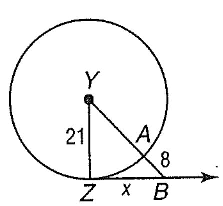
3.



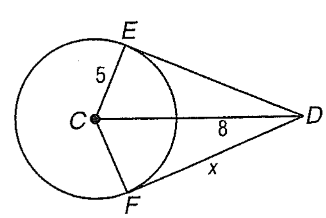
4.



5.



6.

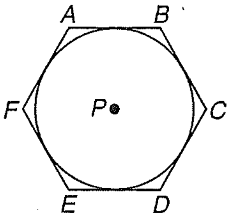


NAME ______________________________ DATE ____________ PERIOD _____

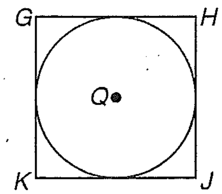
10-5 Study Guide and Intervention *(continued)*

Tangents

Circumscribed Polygons When a polygon is circumscribed about a circle, all of the sides of the polygon are tangent to the circle.

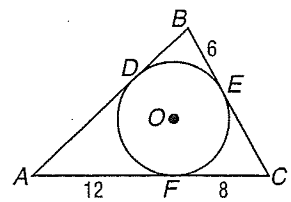


Hexagon *ABCDEF* is circumscribed about ⊙*P*.
$\overline{AB}$, $\overline{BC}$, $\overline{CD}$, $\overline{DE}$, $\overline{EF}$, and $\overline{FA}$ are tangent to ⊙*P*.



Square *GHJK* is circumscribed about ⊙*Q*.
$\overline{GH}$, $\overline{JH}$, $\overline{JK}$, and $\overline{KG}$ are tangent to ⊙*Q*.

Example **△*ABC* is circumscribed about ⊙*O*. Find the perimeter of △*ABC*.**



△*ABC* is circumscribed about ⊙*O*, so points *D*, *E*, and *F* are points of tangency. Therefore $AD = AF$, $BE = BD$, and $CF = CE$.

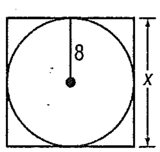
$P = AD + AF + BE + BD + CF + CE$
$= 12 + 12 + 6 + 6 + 8 + 8$
$= 52$

The perimeter is 52 units.

Exercises

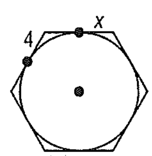
Find *x*. Assume that segments that appear to be tangent are tangent.

1.



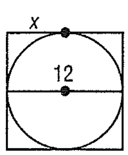
square

2.



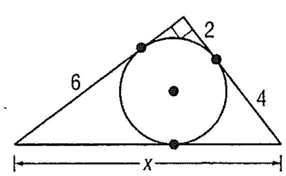
regular hexagon

3.

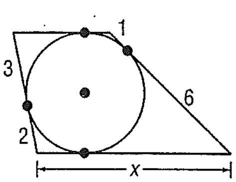


square

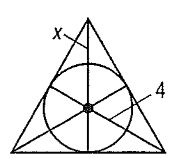
4.



5.



6.



equilateral triangle

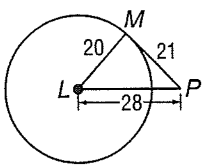
NAME ______________________ DATE __________ PERIOD _____

10-5 Practice

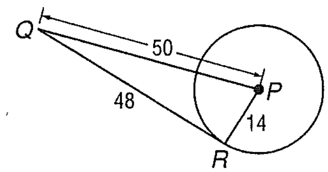
Tangents

Determine whether each segment is tangent to the given circle.

1. $\overline{MP}$

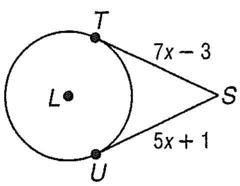


2. $\overline{QR}$

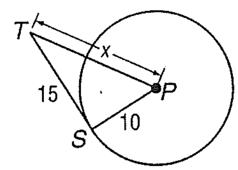


Find *x*. Assume that segments that appear to be tangent are tangent.

3.

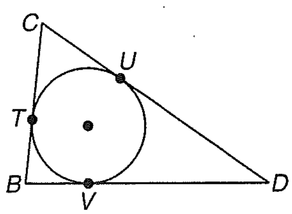


4.

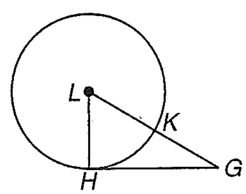


Find the perimeter of each polygon for the given information. Assume that segments that appear to be tangent are tangent.

5. $CD = 52$, $CU = 18$, $TB = 12$

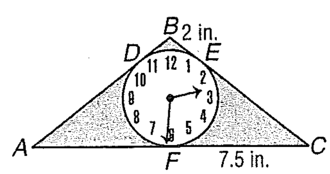


6. $KG = 32$, $HG = 56$



CLOCKS For Exercises 7 and 8, use the following information.

The design shown in the figure is that of a circular clock face inscribed in a triangular base. *AF* and *FC* are equal.



7. Find *AB*.

8. Find the perimeter of the clock.