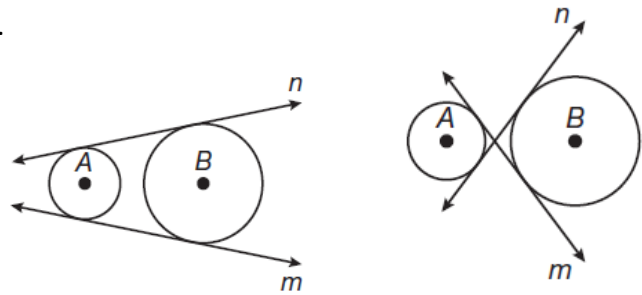# Geometry Lesson 72

Objective: TSW understand and use tangents and circles.

Tangent - A line that intersects a circle at exactly one point.

Point of Tangency - The intersection between the circle and the tangent.

_____ Tangent – A tangent to two circles. Common tangents can be internal tangents or external tangents.
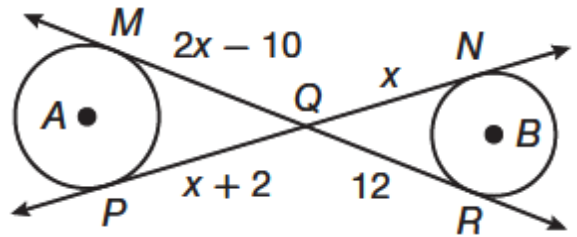
External Common Tangents   Internal Common Tangents

Recall Theorem 58-3: If two tangent segments are drawn to a circle from the same exterior point, then they are congruent.

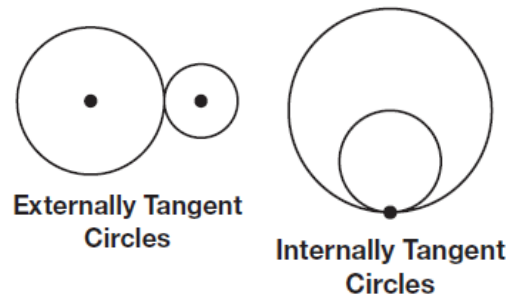Example 1 Solving Problems with Common Tangents

Given that $\overleftrightarrow{MR}$ and $\overleftrightarrow{PN}$ are internal common tangents to $\odot A$ and $\odot B$, find the length of $\overline{MQ}$.

SOLUTION

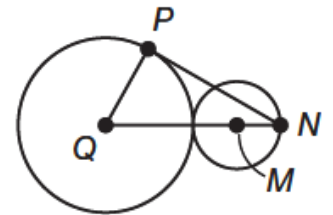Tangent _____ - coplanar circles that intersect at exactly one point.

Tangent circles can be internally tangent or externally tangent. In both cases, the radii of the two circles are collinear.

Externally Tangent Circles

Internally Tangent Circles

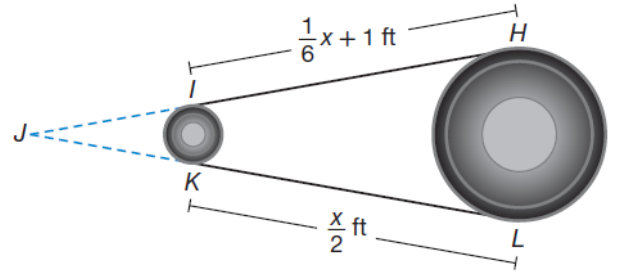Example 2 Solving Problems with Tangent Circles

In the diagram, $\odot Q$ is tangent to $\odot M$ and $\overline{NP}$ is tangent to $\odot Q$. The radius of $\odot Q$ is 5 centimeters and the radius of $\odot M$ is 2 centimeters. Find the area of ΔQNP to the nearest square centimeter.

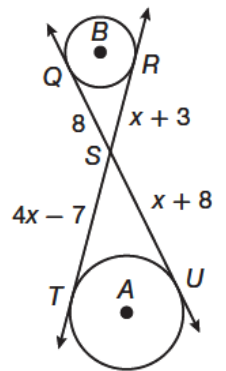SOLUTION

Example 3 Application: Mechanics

A car has a timing belt that consists of two pulleys and a belt, as shown in the diagram. The belt runs around the two pulleys and is tangent to both of them. The dotted segments, $\overline{JI}$ and $\overline{JK}$, have been drawn into the diagram to assist in finding the distance between the two pulleys. Find *IH* and *KL*.
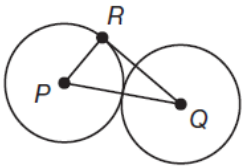
$\frac{1}{6}x + 1$ ft

H

I

J

K

$\frac{x}{2}$ ft

L

    SOLUTION

You Try!!!!

a. In the diagram, $\overline{RT}$ and $\overline{QU}$ are tangents to the circles. Find the lengths of $\overline{RS}$, $\overline{ST}$, and $\overline{SU}$.

B

Q R

8 $x + 3$

S

$4x - 7$ $x + 8$

T A U

b. Determine the area of ΔPQR to the nearest square inch if $\odot P$ and $\odot Q$ are congruent tangent circles with radii of 6 inches each.

R

P

Q

c. Pulleys: A system of pulleys is set up as shown. Find the value of *x*.

19 ft

C

B

A

D

$(5x - 6)$ ft

E