

Circles

Name: Notes

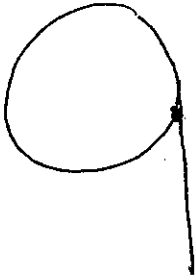
Tangent Lines

Date: _____ Period: _____

Essential Question

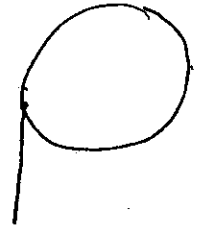
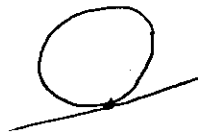
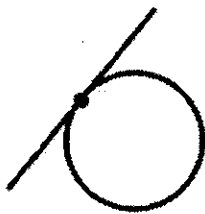
When is a line tangent to a circle?

Tangent



A tangent is a line or line segment that touches a circle at exactly one point.

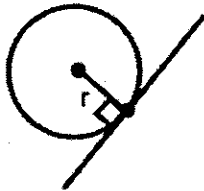
Draw 3 more circles with a tangent



Tangent Theorem #1

A tangent line is always perpendicular to the radius of the circle.

all tangent lines are perpendicular to the radius.



Example #1

Is \overline{CB} a tangent line?

right triangle

therefore:

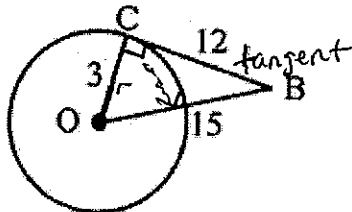
$$a^2 + b^2 = c^2$$

$$3^2 + 12^2 = 15^2$$

$$9 + 144 = 225$$

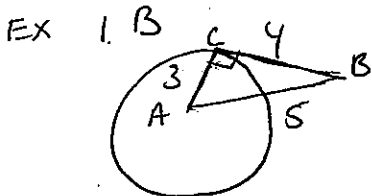
$$153 = 225 ?$$

Not Tangent =



no -

\overline{BC} is not a tangent line so $\angle C$ is not 90°

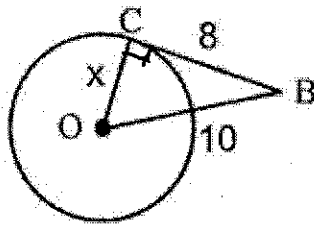


$$3^2 + 4^2 = 5^2$$

$9 + 16 = 25$ yep - \overline{CB} is tangent

Example #2

\overline{CB} is a tangent line. Find the value of x .



$$8^2 + a^2 = 10^2$$

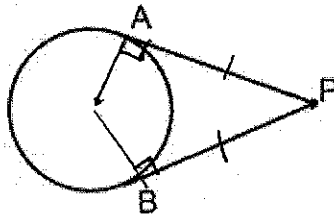
$$64 + a^2 = 100$$

$$\begin{array}{r} -64 \\ \hline \sqrt{a^2} = \sqrt{36} \\ a = 6 \end{array}$$

Tangent Theorem #2

If two tangents to the same circle share a point outside of the circle, then the two tangents are equal in length.

Everytime you know something is tangent - draw in your right angle

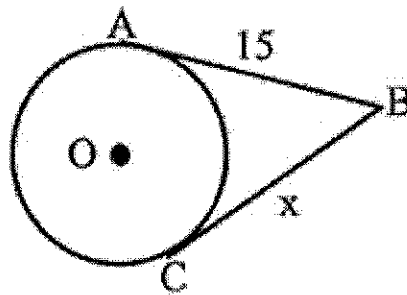


If $\overline{AP} = 10$ Then $\overline{BP} = 10$

Example #3

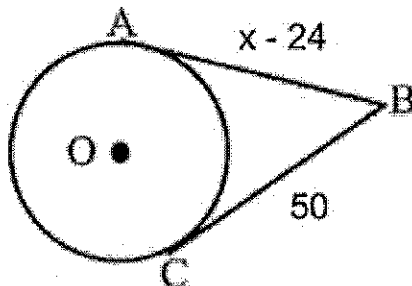
Find the value of x if \overline{AB} and \overline{BC} are tangent to Circle O.

$x = 15$



Example #4

\overline{AB} and \overline{BC} are tangents. Find the value of x .

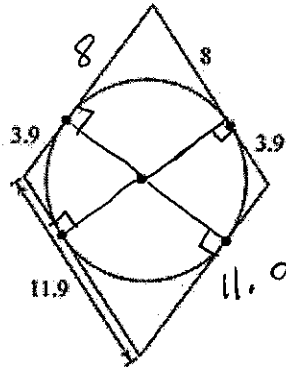


$$x - 24 = 50$$

$$x = 74$$

Example #5

All lines are tangents. Find the perimeter of the polygon.



• Draw in all radii and right angles

• table tangent measures

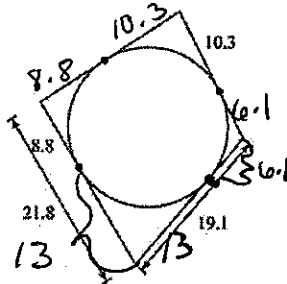
$$\begin{aligned} \text{perimeter} &= \text{add all sides} \\ &8 + 8 + 3.9 + 3.9 + 11.9 + 11.9 \\ &= 47.6 \mu \end{aligned}$$

Example #6

All lines are tangent. Find the perimeter of the polygon.

Don't assume anything.

Figure it out counter clockwise.



$$\begin{array}{r} 19.1 \\ - 13 \\ \hline 6.1 \end{array}$$

$$\begin{array}{r} 21.8 \\ - 8.8 \\ \hline 13 \end{array}$$

- 10.3
- 10.3
- 8.8
- 8.8
- 13
- 13
- 6.1
- 6.1

76.4

Summary

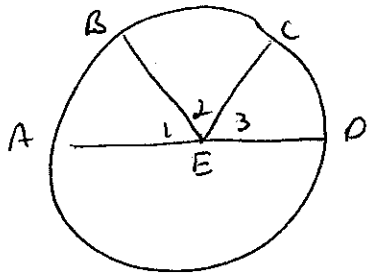
Describe how to tell if a line is tangent to a circle.

It touches the circle at exactly one point.
It is perpendicular to the radius.

Review of central angles and inscribed angles here

Central angles

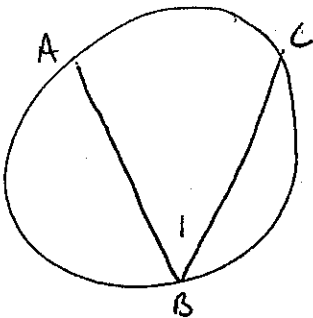
vertex is on the center of the circle



The arc and angle ~~are~~ are equal

$$m\angle 1 = 68^\circ$$

$$\widehat{AB} = 68^\circ$$

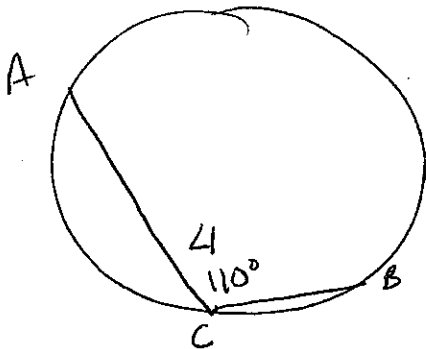


Inscribed angles - vertex is on the circle

angle = half the arc

$$\widehat{AC} = 100^\circ$$

$$\angle 1 = 50^\circ$$



$$\angle 1 = 110^\circ \text{ so } \widehat{AB} = 200^\circ$$