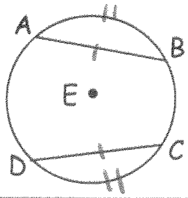
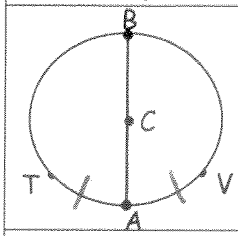
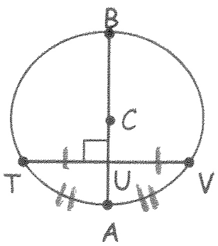
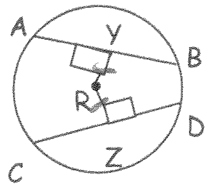
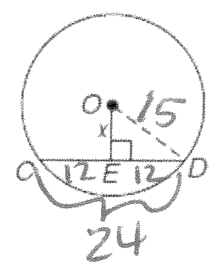
10-3 Arcs and Chords

DIAGRAM	THEOREMS	EXAMPLES
	In the same circle or in congruent circles, two minor arcs are $\cong$ if and only if their corresponding chords are $\cong$.	If $\overline{AB} \cong \overline{CD}$, then $\widehat{AB} \cong \widehat{CD}$
	If a line, segment or ray bisects the arc, then it divides an arc into two congruent arcs.	If $\overline{AB}$ bisects $\widehat{TV}$, then $\widehat{TA} \cong \widehat{AV}$
	If a diameter (or radius) of a circle is perpendicular to a chord, then it bisects the chord and its arc. The perpendicular bisector of a chord is a diameter or radius of the circle.	If $\overline{BA} \perp \overline{TV}$, then $\overline{UT} \cong \overline{UV}$ and $\widehat{AT} \cong \widehat{AV}$
	In the same circle or in congruent circles, two chords are congruent if and only if they are equidistant from the center.	If $\overline{RY} \cong \overline{RZ}$, then $\overline{AB} \cong \overline{CD}$.

Example In $\odot O$, $\overline{CD} \perp \overline{OE}$, $OD = 15$, and $CD = 24$. Find x.



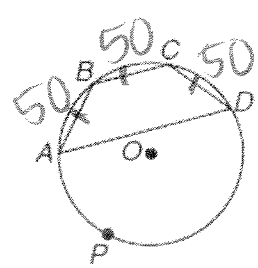
$x^2 + 12^2 = 15^2$

$x^2 + 144 = 225$

$\cancel{x^2 = 81}$

$x = 9$

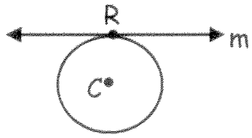
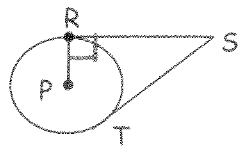
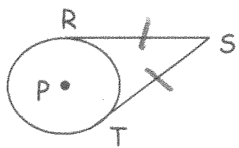
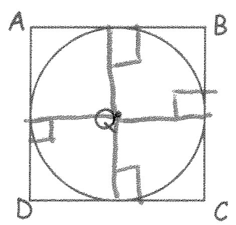
Example Trapezoid $ABCD$ is inscribed in $\odot O$. If $\overline{AB} \cong \overline{BC} \cong \overline{CD}$ and $m\widehat{BC} = 50$, what is $m\widehat{APD}$?



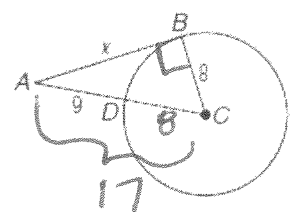
$360 - 3(50)$

$360 - 150 = 210$

10-5 Tangents

DIAGRAM	DEFINITIONS & THEOREMS	EXAMPLES
	**Tangent**: a line in the same plane that intersects the circle in exactly 1 point, called the point of tangency.	Line m is tangent to ⊙C at point R
	In a plane, if a line is tangent to a circle, then it is perpendicular to the radius drawn to the point of tangency.	If $\overline{RS}$ is tangent to ⊙P, then $\overline{RS} \perp \overline{PR}$.
	If two segments from the same exterior point are tangent to a circle, then they are ≅.	If $\overline{SR}$ and $\overline{ST}$ are tangent to ⊙P, then $\overline{SR} \cong \overline{ST}$.
	**Circumscribed Polygons**: a polygon is circumscribed about a circle if each side of the polygon is tangent to the circle.	ABCD is circumscribed about ⊙Q because $\overline{AB}$, $\overline{BC}$, $\overline{CD}$, and $\overline{AD}$ are tangents.

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



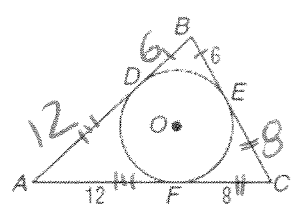
$x^2+8^2=17^2$

$x^2+64=289$

$x^2=225$

$x=15$

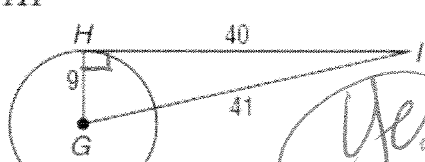
Example $\triangle ABC$ is circumscribed about ⊙O. Find the perimeter of $\triangle ABC$.



$6+6+8+8+12+12=52$

Determine whether each segment is tangent to the given circle.

1. $\overline{HI}$



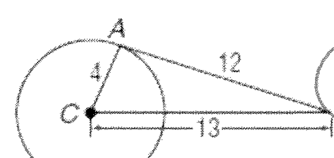
Yes

Does $9^2+40^2=41^2$

$81+1600=1681$

$1681=1681$

2. $\overline{AB}$



No

Does $4^2+12^2=13^2$

$16+144=169$

$160<169$

∠CAB is an obtuse ∠!