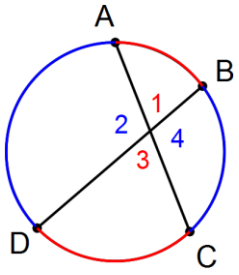
SM 2

Date: **Section: 12.2**

Objective: Tangent and Chord Theorems Notes

Theorem:

- If two chords intersect inside a circle, then the measure of each angle formed is the average of the measures of the arcs intercepted by the angle and its vertical angle.

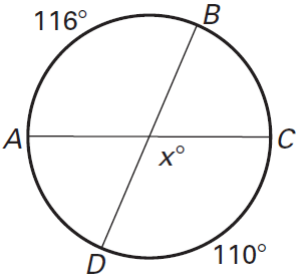


$$m\angle 1 = m\angle 3 = \frac{1}{2}\ mAB + mCD$$

$$m\angle 2 = m\angle 4 = \frac{1}{2}\ mBC + mAD$$

Examples: Find the value of x.

a)



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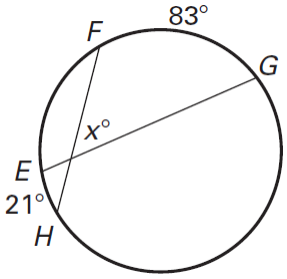

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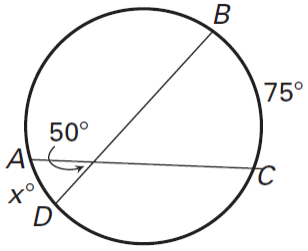

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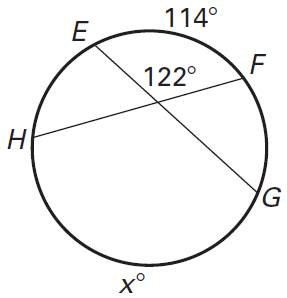
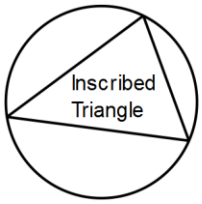
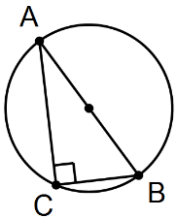


Inscribed Polygon: A polygon whose vertices all lie on a circle.



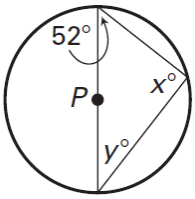
Theorems:

- If a triangle inscribed in a circle is a right triangle, then the hypotenuse is a diameter of the circle.
- If $\triangle ABC$ is a right triangle with hypotenuse $\overline{AB}$, then $\overline{AB}$ is a diameter of the circle.
- If a side of a triangle inscribed in a circle is a diameter of the circle, then the triangle is a right triangle.
- If $\overline{AB}$ is a diameter of the circle, then $\triangle ABC$ is a right triangle with $\overline{AB}$ as hypotenuse.



Examples: Find the values of x and y in $\odot P$.

a)



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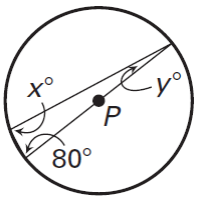

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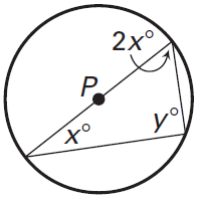
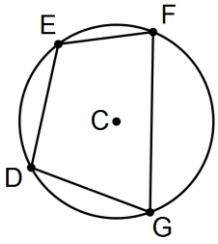


Theorem:

- If a quadrilateral can be inscribed in a circle, then its opposite angles are supplementary.

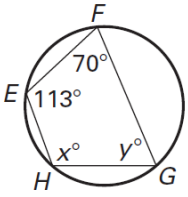


$m\angle D + m\angle F = 180°$

$m\angle E + m\angle G = 180°$

Examples: Find the values of x and y.

a)



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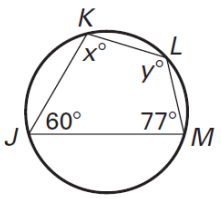

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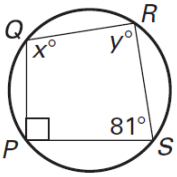
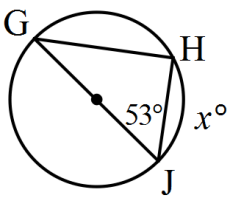


Find the measure of the arc or angle indicated.

a)



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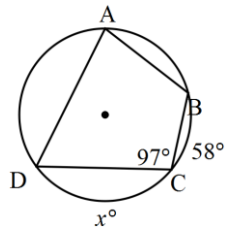

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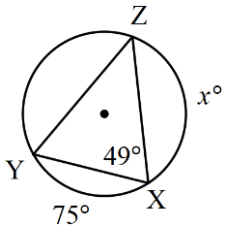
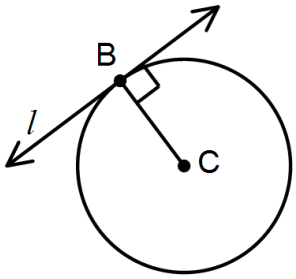


Theorems about Tangents:

- If a line is tangent to a circle, then it is perpendicular to the radius drawn at the point of tangency.

  If line l is tangent to $\odot C$ at B, then $l \perp \overline{CB}$.

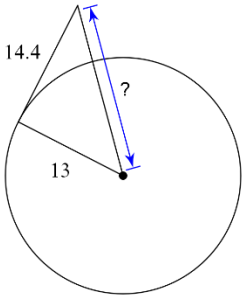


- In a plane, if a line is perpendicular to a radius of a circle at its endpoint on the circle, then the line is tangent to the circle.

  If $l \perp \overline{CB}$, then line l is tangent to $\odot C$ at B.

Examples: Find the length of the missing segment. Assume that segments which appear to be tangent to the circle are tangent to the circle.

a)



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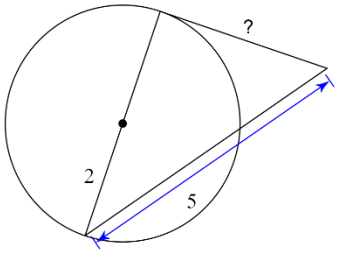
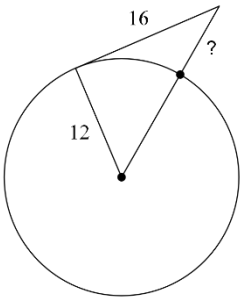


c)



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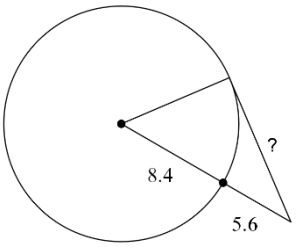
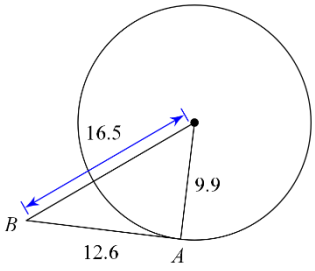


Examples: Determine whether $\overline{AB}$ is tangent to the circle. Explain your reasoning.

a)



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