

Tangent Lines and Tangent Circles

Tangent Line: a line in the plane of the circle that intersects the circle at exactly one point

Point of Tangency: the point of intersection

Tangent Circles: two circles whose intersection is exactly one point

Common Tangent: a line which is tangent to two circles

Common Internal Tangent: a common tangent which intersects the segment joining the centers of two circles

Common External Tangent: a common tangent which does not intersect the segment joining the centers of two circles

Internally Tangent Circles: circles that are coplanar, share a common point of tangency, and with centers that lie on the same side of their common tangent

Externally Tangent Circles: circles that are coplanar, share a common point of tangency, and with centers that lie on the opposite sides of their common tangent

Tangent Line Theorem: If a line is tangent to a circle, then it is perpendicular to the radius drawn to the point of tangency.

Converse of the Tangent Line Theorem: In a plane, if a line is perpendicular to a radius of a circle at the endpoint, then it is drawn to the point of tangency.

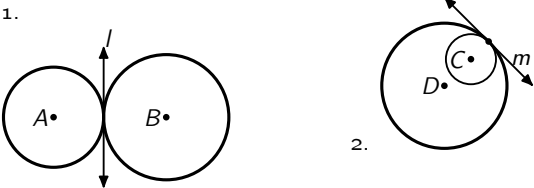
Tangent Segments Theorem: If two tangent segments are drawn to a circle from an external point, then

- a. the two tangent segments are congruent, and
- b. the angles between the tangent segments and the line joining the external point to the center of the circle are congruent

Tangent Circles Theorem: If two circles are tangent internally or externally, then their line of centers pass through the point of contact.

Practice Exercises

A. Give the appropriate term for each figure below.



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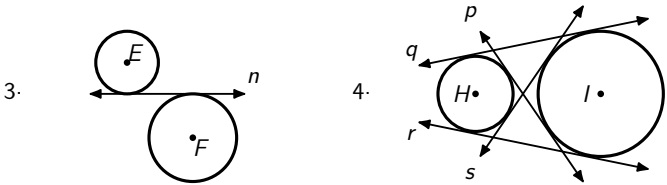
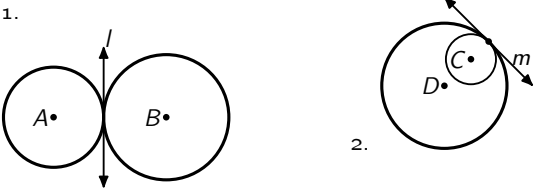
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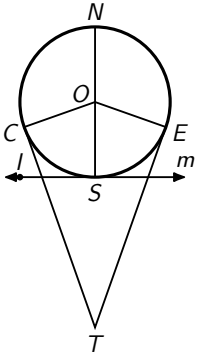
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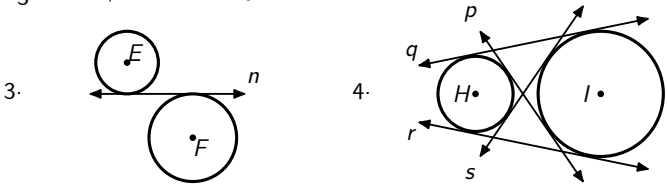
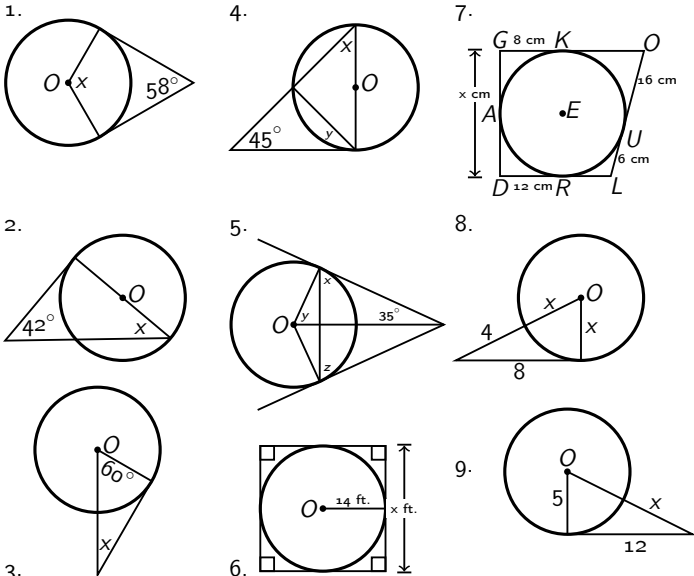
B. In $\odot O$, \overline{CT} , \overline{ET} are tangent segments and m is tangent to $\odot O$ at S.

- 1. $m\angle OCT = \underline{\hspace{1cm}}$.
- 2. $m\angle OSI = \underline{\hspace{1cm}}$.
- 3. If $\overline{SN} = 24$ units, then $\overline{OE} = \underline{\hspace{1cm}}$.
- 4. If $\overline{OS} = 5$ units and $\overline{SI} = 12$ units, then $\overline{OI} = \underline{\hspace{1cm}}$.
- 5. If $\overline{CT} = 15$ units, then $\overline{ET} = \underline{\hspace{1cm}}$.
- 6. If $\overline{OC} = 8$ units and $\overline{ET} = 15$ units, then $\overline{OT} = \underline{\hspace{1cm}}$.
- 7. If $\overline{OE} = 11$ units, then $\overline{NS} = \underline{\hspace{1cm}}$.
- 8. If $\overline{OS} = 7$ units and $\overline{OT} = 25$ units, then $\overline{CT} = \underline{\hspace{1cm}}$.



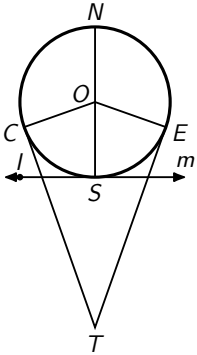
Problem Set

Use the given figures to find the values of x and y .



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