

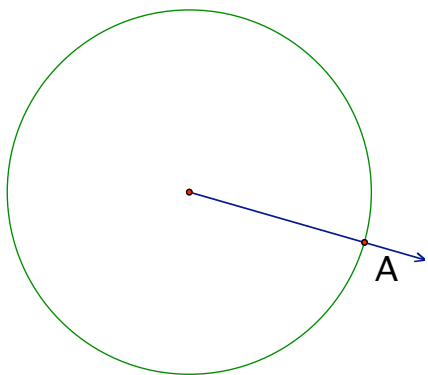
Chapter 10- Lesson 2

Tangent to a Circle¹

Goals

Develop an understanding and facility with using concepts and skills related to tangents of circles.

1. If you have a circle and a straight line lying in a plane, the straight **line** will **intersect** the **circle** in either **two** points, **one** point, or **not at all**. Sketch each of these possibilities.
2. In the first case, where we have two points of intersection, the line is called a *secant line* or simply a *secant*. In the second case the line is called a *tangent line* or simply a *tangent*, and the point where it meets the circle is often called the point of contact or the *point of tangency*. In the third case there is no special name for the line. **Label your drawings above with these terms.**
3. Draw a line tangent to the circle through point A. There is something special to notice-- can you figure out what it is? Write your conjecture.



If _____,

then _____.

¹ Based on "Geometry, A Guided Inquiry", Chakerian, Crabill, Stien

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4. Constructing a Tangent Line to a Circle

Now draw a circle with center O and mark a point P on the circumference of the circle. Using only a straightedge and compass, construct a tangent line to the circle at point P . Leave your construction marks as justification.

5. Constructing a Circle Tangent to a Line

Draw a line ℓ and mark a point O not on line ℓ . Now, using only a straightedge and compass, construct a circle with center O such that ℓ is a tangent line to the circle.

6. Complete the following:

Any tangent line of a circle is _____ to the radius at the point of tangency.

Conversely, a line that intersects a circle at a point and is perpendicular to the radius at that point is _____ to the circle.

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8. Complete the following:

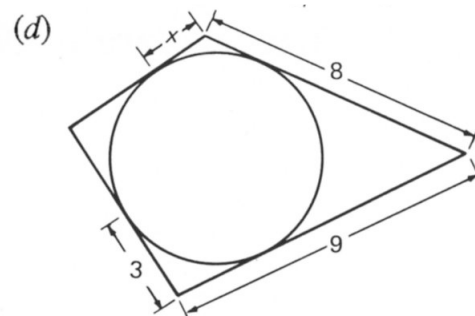
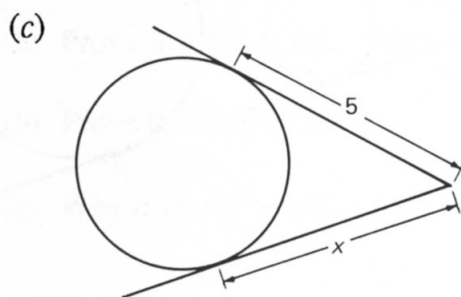
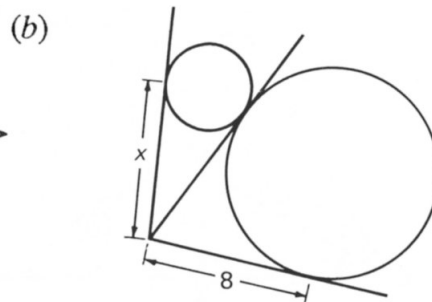
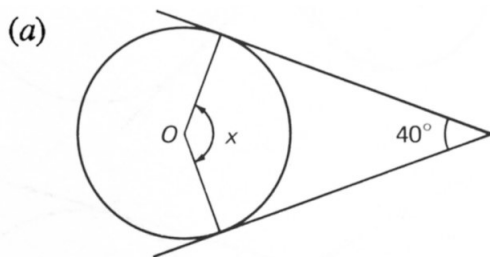
If two segments from an exterior point are tangent to a circle, then the segments are _____.

If two tangents to a circle are drawn from an external point, then their angle _____ passes through the _____ of the circle.

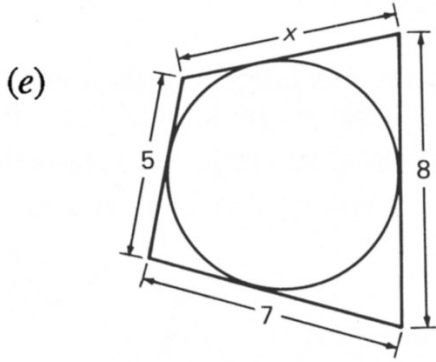
Puzzles

Find x . **Justify by showing clear work or writing an explanation.** The letter O denotes the center of the circle where it appears in these puzzles. Also, you may assume that lines which look like tangents are tangents.

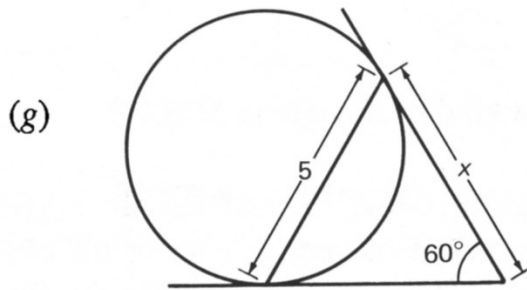
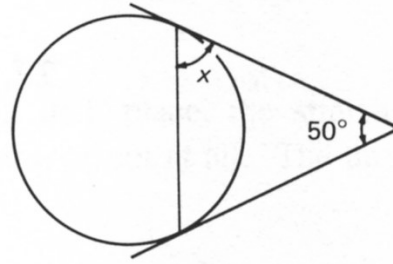
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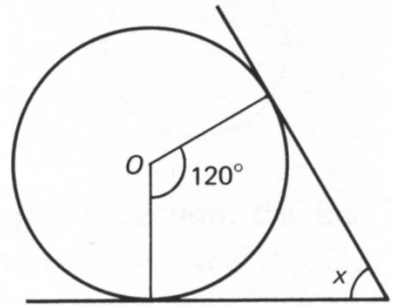
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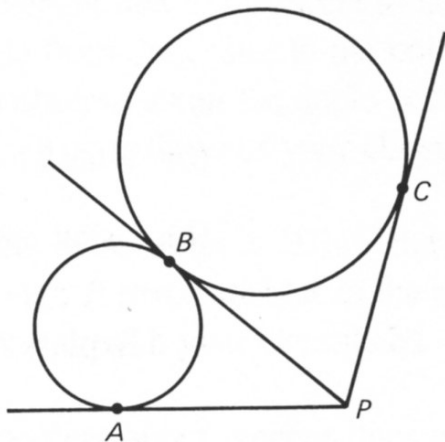
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(h)

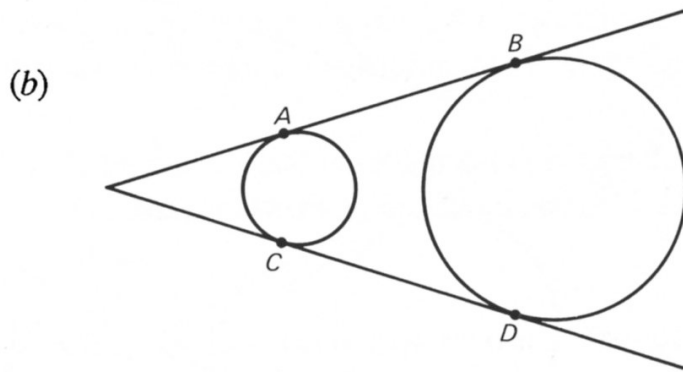
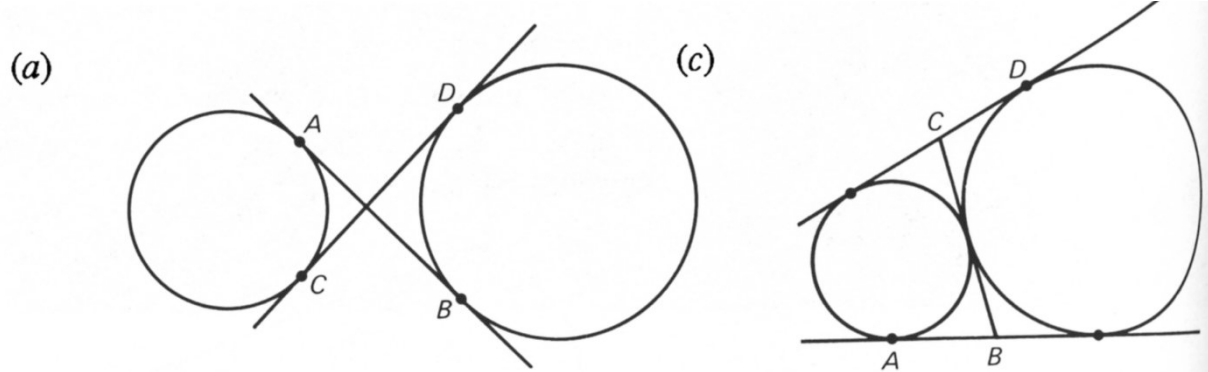


2. Why does $PA = PC$? Justify.



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3. In each case, show why $AB = CD$. These are tough! Writing proofs might be easiest!



4. In the figure below, only part of a circle is shown. Can you find where the center of the circle would be? Justify by showing clear construction marks and completing the circle.

