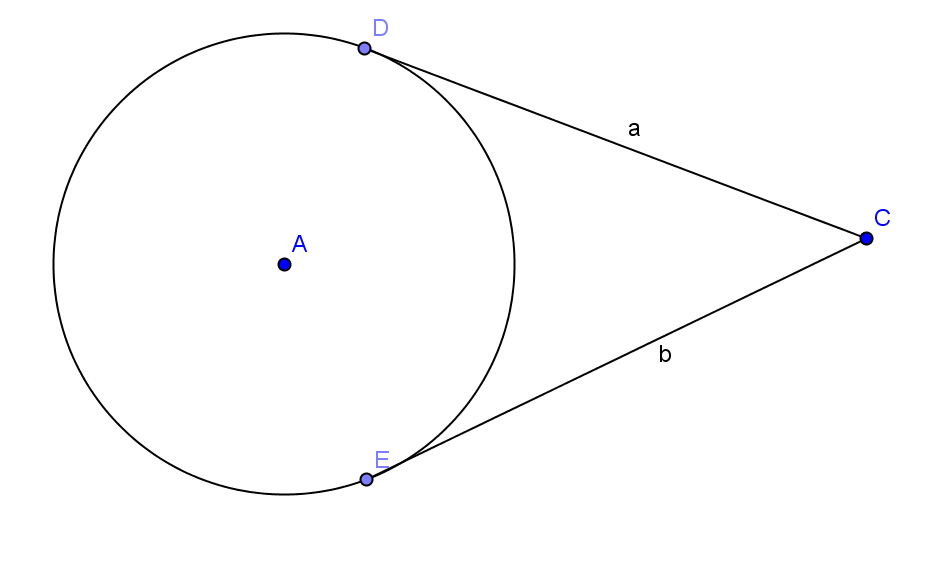
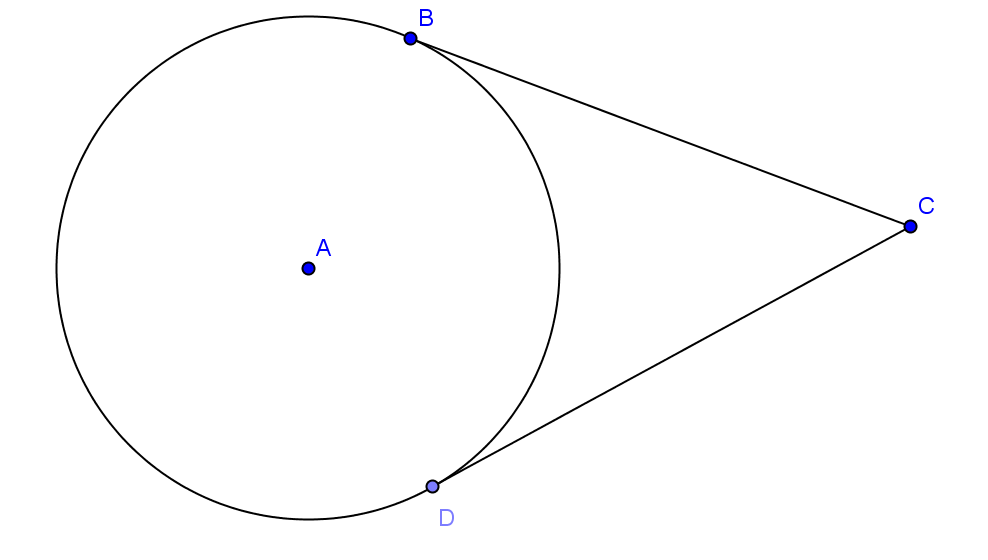
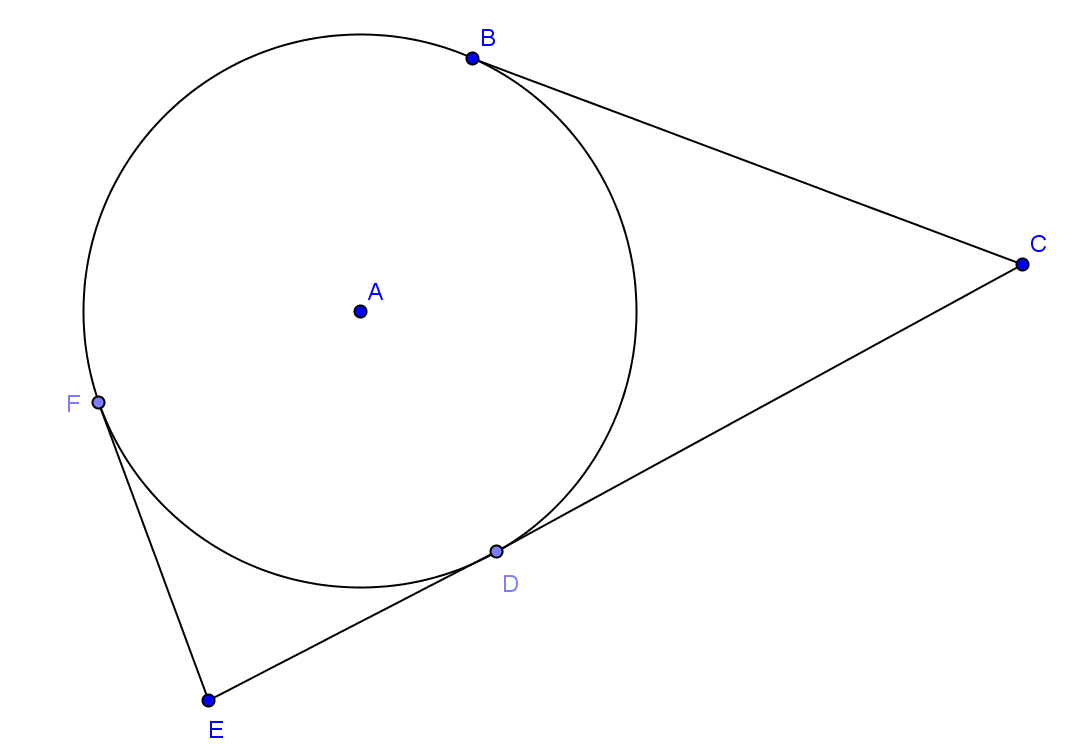
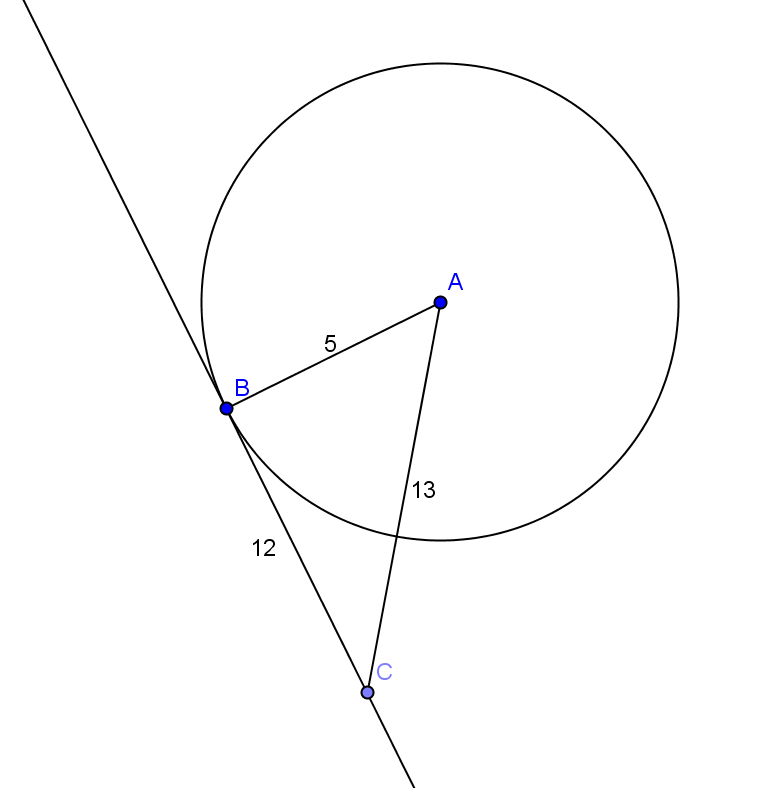
Lesson 11: Properties of Tangents

Classwork

Exercises 1–3

1.  and are tangent to circle at points and respectively. Use a two-column proof to prove .
2. In circle , the radius is mm and mm.
   1. Find .
   2. Find the area of
   3. Find the perimeter of quadrilateral .
3. In circle , and . . Find
   1. The radius of the circle.
   2. (round to the nearest whole number)

Problem Set

Lesson Summary

**Theorems:**

* A tangent line to a circle is perpendicular to the radius of the circle drawn to the point of tangency.
* A line through a point on a circle is tangent at the point if, and only if, it is perpendicular to the radius drawn to the point of tangency.

**Relevant Vocabulary**

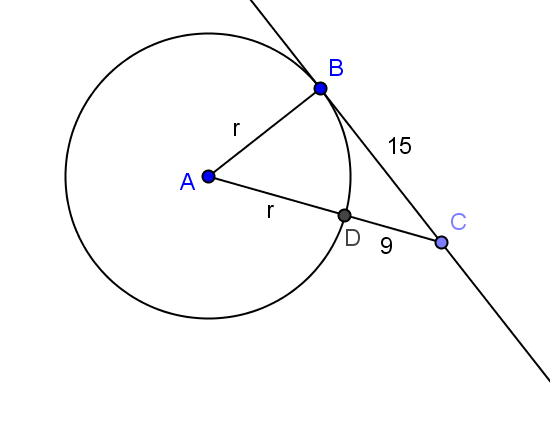
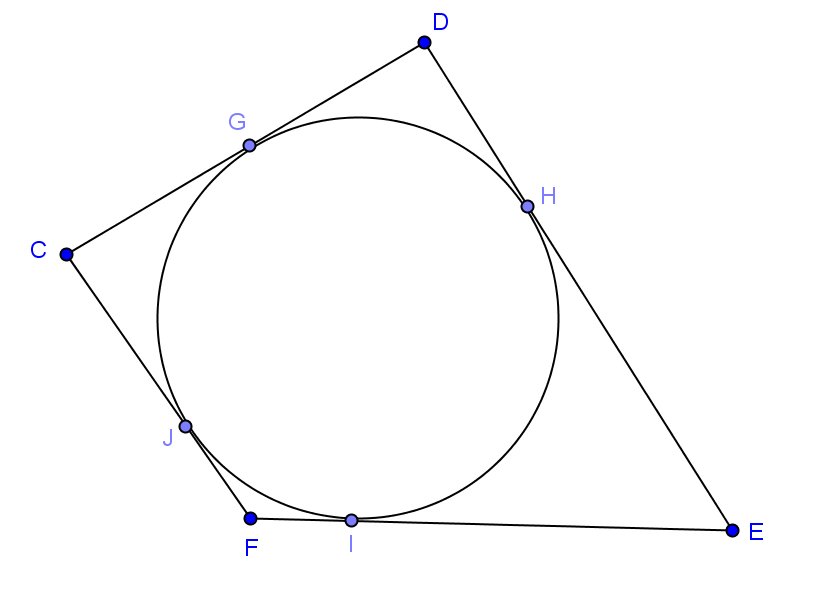
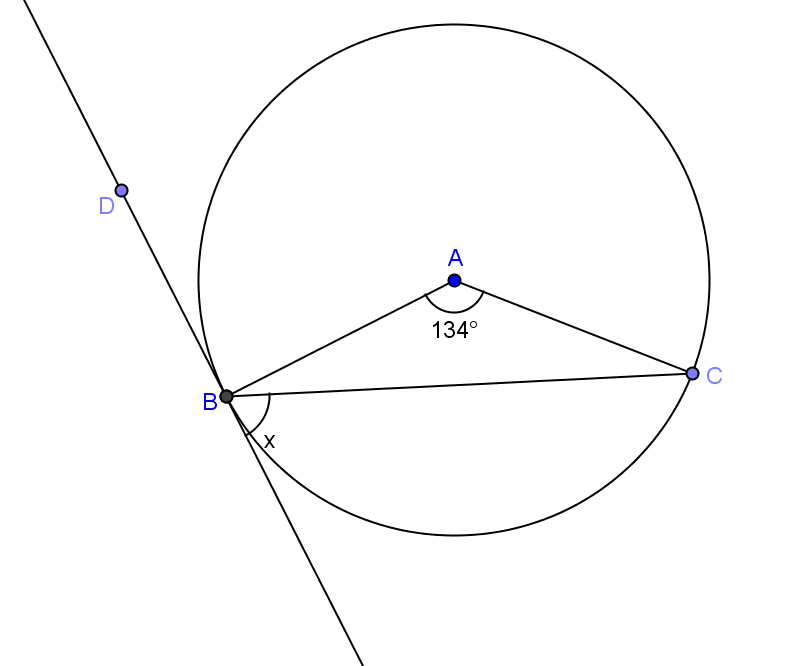
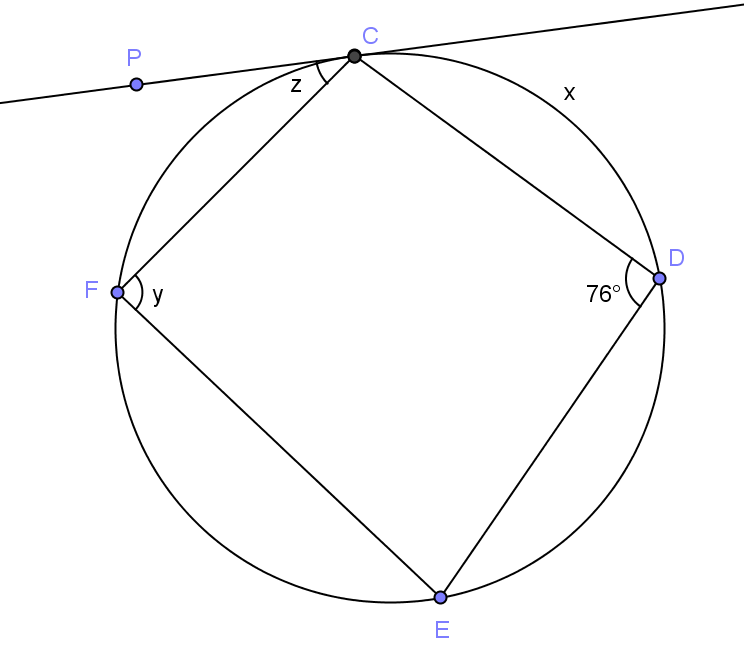
* **Interior of a circle**: The *interior of a circle* *with center* *and radius* is the set of all points in the plane whose distance from the point is less than .

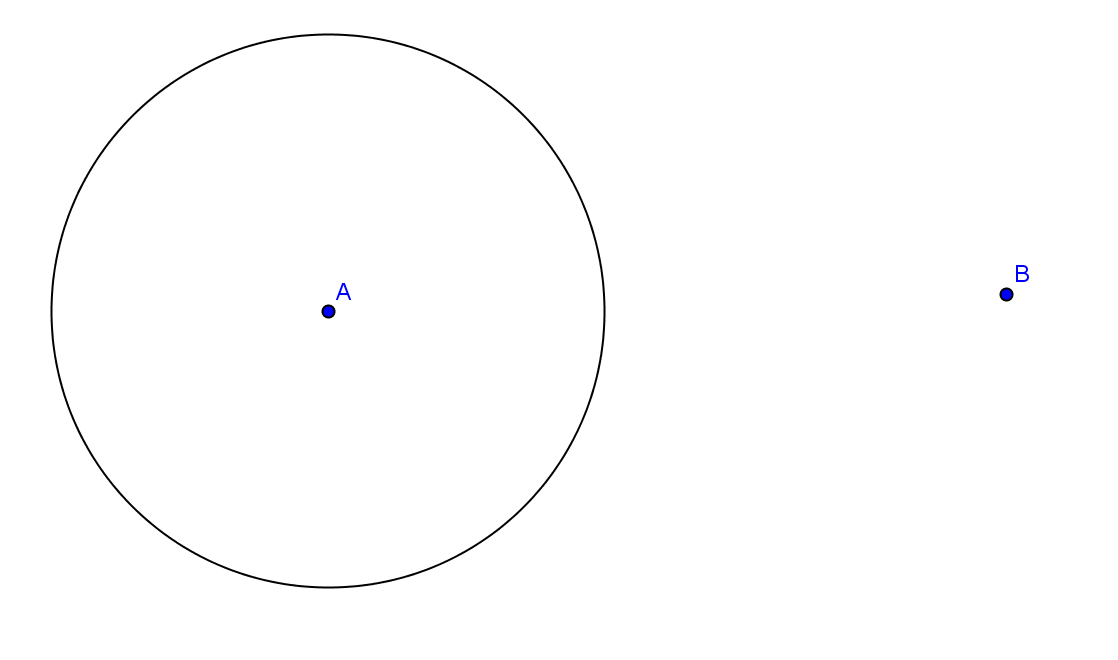
A point in the interior of a circle is said to be *inside the circle.* A disk is the union of the circle with its interior.

* **Exterior of a circle**: The exterior of a circle with center and radius is the set of all points in the plane whose distance from the point is greater than .

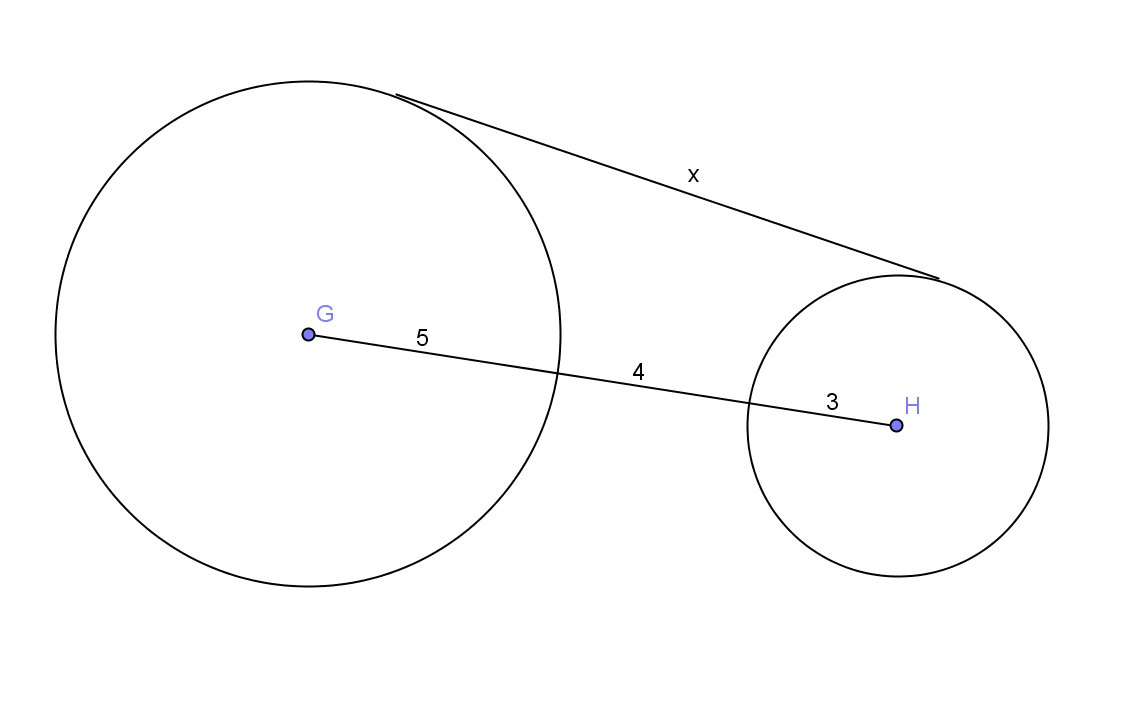
A point exterior to a circle is said to be *outside the circle.*

* **Tangent to a circle**: A *tangent line to a circle* is a line in the same plane that intersects the circle in one and only one point. This point is called the *point of tangency*.
* **Tangent segment/ray**: A segment is a *tangent segment* *to a circle* if the line that contains it is tangent to the circle and one of the end points of the segment is a point of tangency. A ray is called a *tangent ray to a circle* if the line that contains it is tangent to the circle and the vertex of the ray is the point of tangency.
* **Secant to a circle**: A *secant line to a circle* is a line that intersects a circle in exactly two points.
* **Polygon Inscribed in a circle**: A polygon is *inscribed in* a circle if all of the vertices of the polygon lie on the circle.
* **Circle Inscribed in a polygon**: A circle is *inscribed* in a polygonif each side of the polygon is tangent to the circle.

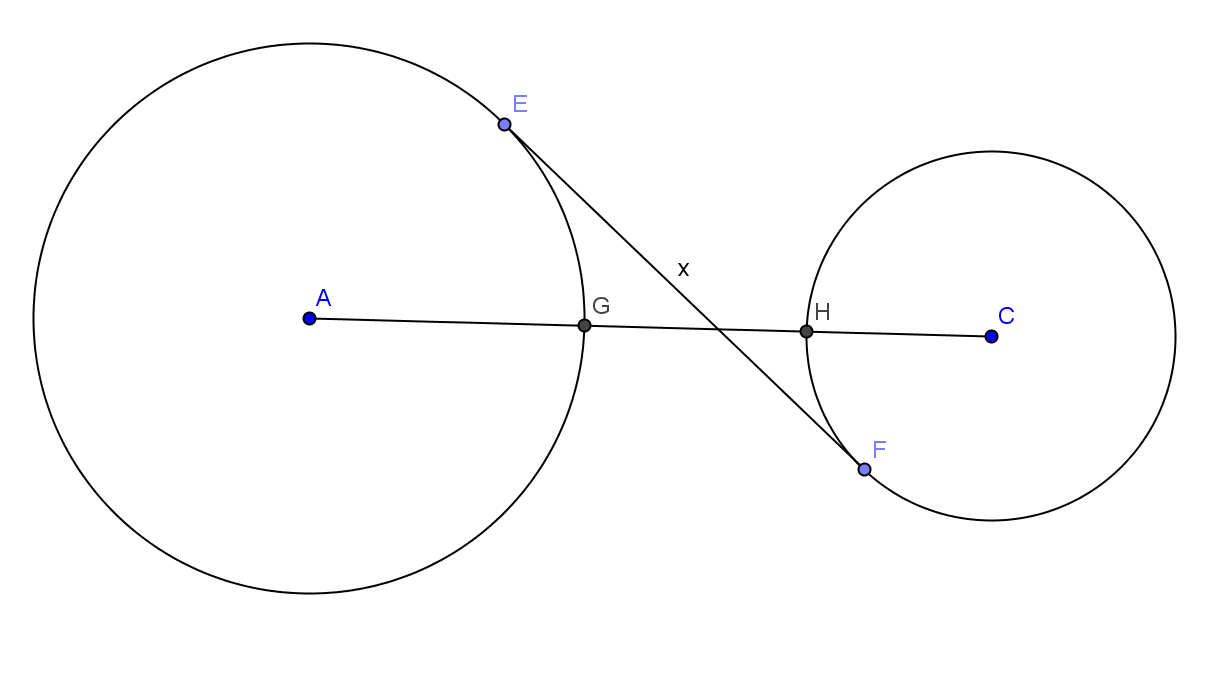
1. If , , and , is tangent to circle at point ? Explain.
2. **** is tangent to circle at point . and .
   1. Find the radius of the circle.
   2. Find .
3. ******A circular pond is fenced on two opposite sides ( with wood and the other two sides with metal fencing. If all four sides of fencing are tangent to the pond, is there more wood or metal fencing used?
4. ****Find if the line shown is tangent to the circle at point .
5. Line is tangent to the circle at point , and . Find
   1. ()
   2. (
   3. ()
6. Construct two lines tangent to circle through point .



1. Find , the length of the common tangent line between the two circles (round to the nearest hundredth).



1. is tangent to both circles and . The radius of circle is , and the radius of circle is . The circles are units apart. Find the length of , (round to the nearest hundredth).

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