

1. Construct an arbitrary triangle using the line segment tool.
2. Locate the midpoint of the three sides of the original triangle using the midpoint tool
3. Construct the altitudes of the triangle using the perpendicular line tool.
4. Mark the intersections of the altitudes with the sides of the triangles with points.
5. Locate the midpoint of the each line segment connecting the orthocenter to a vertex.
6. Notice that nine of the points in the construction form a perfect circle. Use the circle through 3 points tool to construct this circle.
7. Use the eraser tool to hide all lines other than the sides of the triangle using the eraser tool. (They will still be there, but we no longer need them.)
8. Construct the inscribed circle of the triangle (recall that the center of the inscribed circle located at the center of the angle bisectors).
9. What do you notice about the two circles?
10. Using the perpendicular line tool, construct a line that is perpendicular to the one of the angle bisector and passes through its vertex. Repeat this for the other two angle bisectors.
11. Mark the intersection of these perpendiculars outside the triangle with a point. (You will might need to resize the triangle to see the intersections.)
12. Construct a line that is perpendicular to the nearest side of the triangle and passes through one of these points. Mark the point of intersection between the perpendicular and the side. Repeat this for the other two sides.
13. Using the circle tool, construct a circle that is centered at one of these points and tangent to the nearest edge of the circle. Repeat this for the other two sides.
14. Hide all points and lines other than the centers of the circles. What do you notice about the circles?