

Angle Bisectors

Name(s): _____

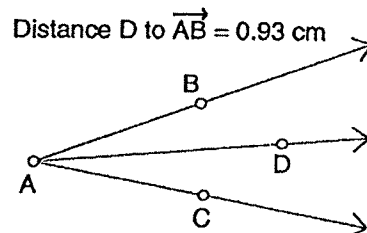
An *angle bisector* is a ray that has its endpoint at the vertex of the angle and that divides the angle into two angles of equal measure. In this investigation, you'll investigate a special property of points on an angle bisector.

Press and hold down the mouse button on the current **Straightedge** tool. Drag to choose the **Ray** tool.



Select, in order, points B , A , and C ; then, in the Construct menu, choose **Angle Bisector**.

- 1. Construct \overrightarrow{AB} and \overrightarrow{AC} to form $\angle BAC$.
2. Construct the bisector of $\angle BAC$.
3. Drag point B and observe the angle bisector.
4. Construct point D on the angle bisector.



- Q1** Drag point D . Without measuring, make a guess about the distances from point D to each of the angle's two sides.

Select point D and \overrightarrow{AB} ; then, in the Measure menu, choose **Distance**.

- 5. Measure the distance from point D to \overrightarrow{AB} .
6. Measure the distance from point D to \overrightarrow{AC} .

Select three points that name the angle, with the vertex your second selection; then, in the Measure menu, choose **Angle**.

- 7. Measure angles BAD and DAC .
- Q2** Drag point A , B , or C to change $\angle BAC$. How do the measures of angles BAD and DAC compare?

- Q3** Drag point D and observe the distances from point D to the two sides of the angle. Write a conjecture about any point on an angle bisector.

Explore More

1. In a new sketch, draw rays AB and AC . Mark \overrightarrow{AC} as a mirror. Reflect \overrightarrow{AB} . Drag different points in your sketch. How are \overrightarrow{AB} and \overrightarrow{AC} related?
2. In a new sketch, see if you can construct an angle bisector using only Sketchpad's freehand tools—not the menus. Make a custom tool for this construction and save it in the Tool Folder (next to the application itself on your hard drive).
3. Write the converse of your conjecture in Q3. Is the converse true? Demonstrate the converse with Sketchpad and explain what you did.

For tips on making and using custom tools, choose **Toolbox** from the Help menu, then click on the Custom Tools link.