

Technology Activity

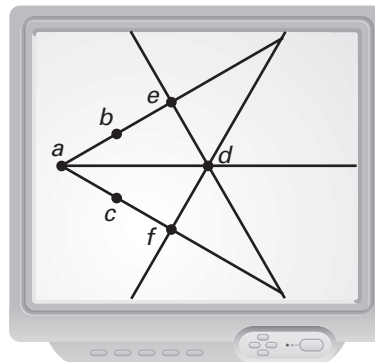
For use with pages 264–271

GOAL To prove Theorem 5.3 using geometry software

In Lesson 5.1, the Angle Bisector Theorem and its proof are given. In this activity, you will verify this theorem using geometry software.

Activity

- 1 Construct angle BAC .
- 2 Bisect angle BAC .
- 3 Place point D on the bisector.
- 4 Find the distance from point D to each ray by constructing perpendicular lines DE and DF .

**Exercises**

1. What can you conclude about point D ?
2. In your construction from the activity, find the measures of $\angle BAD$ and $\angle CAD$. What do these angle measures tell you about \overrightarrow{AD} ?
3. Use geometry software to verify the following theorems.
 - a. Theorem 5.4, Converse of the Angle Bisector Theorem
 - b. Theorem 5.1, Perpendicular Bisector Theorem
 - c. Theorem 5.1, Converse of the Perpendicular Bisector Theorem

Technology Activity Keystrokes

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TI-92

1. Draw angle
- BAC
- .

F2 6 **ENTER** A (Move cursor to location for point B .) **ENTER** **F2** 1 **ENTER** B
F2 6 (Move cursor to point A .) **ENTER** (Move cursor to location for point C .)
ENTER **F2** 1 **ENTER** C

2. Construct the bisector of angle
- BAC
- .

F4 5 (Move cursor to point B .) **ENTER** (Move cursor to point A .) **ENTER**
 (Move cursor to point C .) **ENTER**

- 3.
- F2**
- 2 (Move cursor to the bisector of angle
- BAC
- .)
- ENTER**
- D

4. Draw a line through point
- D
- perpendicular to ray
- AB
- .

F4 1 (Move cursor to ray AB .) **ENTER** (Move cursor to point D .) **ENTER**
F2 3 (Move cursor to intersection of ray AB and the perpendicular line.)
ENTER E

Draw a line through point D perpendicular to ray AC .

F4 1 (Move cursor to ray AC .) **ENTER** (Move cursor to point D .) **ENTER**
F2 3 (Move cursor to intersection of ray AC and the perpendicular line.)
ENTER F

Measure the distance D is from ray AB .

F6 1 (Move cursor to point D .) **ENTER** (Move cursor to point E .) **ENTER**

Measure the distance D is from ray AC .

F6 1 (Move cursor to point D .) **ENTER** (Move cursor to point F .) **ENTER**

Technology Activity Keystrokes

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SKETCHPAD

1. Draw angle BAC .
Choose the ray straightedge tool. Draw ray AB and ray AC .
2. Construct the bisector of angle BAC .
Choose the selection arrow tool and select point B . Then hold down the shift key and select points A and C . Choose **Angle Bisector** from the **Construct** menu.
3. Choose the point tool and plot point D on the bisector.
4. Draw a line through point D perpendicular to ray AB . Choose the selection arrow tool, select point D , hold down the shift key and select ray AB , and choose **Perpendicular Line** from the **Construct** menu. To plot intersection point E , select ray AB and the perpendicular line and choose **Point At Intersection** from the **Construct** menu. Draw a line through point D perpendicular to ray AC . Choose the selection arrow tool, select point D , hold down the shift key and select ray AC , and choose **Perpendicular Line** from the **Construct** menu. To plot intersection point F , select ray AC and the perpendicular line and choose **Point At Intersection** from the **Construct** menu. To measure the distance D is from ray AB , select points D and E and choose **Distance** from the **Measure** menu. To measure the distance D is from ray AC , select points D and F and choose **Distance** from the **Measure** menu.