Name _____

Date _____

EXPLORATIONS

Activity 5

Bisectors

Construct the geometric object by following the instructions below, and then answer the questions about the object.

1. Create and label segment $\overline{AB}$.
2. Create the perpendicular bisector of $\overline{AB}$.
   a. From the Construct Toolbar, select **Perpendicular Bisector**.
   b. Move cursor toward segment $\overline{AB}$ until message ***Perpendicular bisector of this segment*** appears. Click once.
   c. From the Points Toolbar, select **Intersection Point**.
   d. Move the pencil toward the intersection of $\overline{AB}$ and your line until the message ***Point at this intersection*** appears. Click once.
   e. Label this point C.
3. Create a point on the line that contains point C and label it point D.

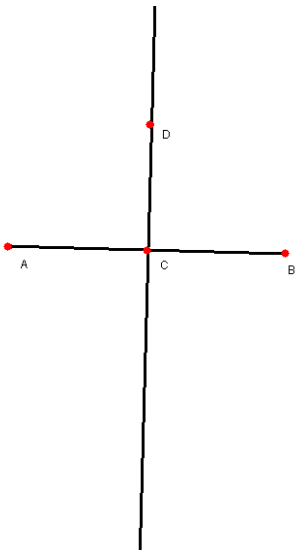

Figure 5.1

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4. Measure, label, and record the following distances:

   AD = _____ BD = _____

5. How are the distances AD and BD related ?

   _____

6. Select **Pointer** and drag point D along the line.
7. Record the new distances below:

   AD = _____ BD = _____

8. Drag point D again and record the distances below:

   AD = _____ BD = _____

9. What can you conclude about a point on the perpendicular bisector of a segment?

   _____

   _____

   _____

10. What type of triangle is ΔADB ?

    _____

11. Clear the screen.
12. Create and label segment $\overline{AB}$.
13. Measure and label the length of $\overline{AB}$.
14. From the Construct Toolbar, select **Measurement Transfer**.
15. Move the pointer to the measurement of $\overline{AB}$ until the message ***This number*** appears. Click once.
16. Move the pointer to point A until the message ***This point*** appears. Click once.
17. Label this new point C.
18. Create segments $\overline{AC}$ and $\overline{CB}$.

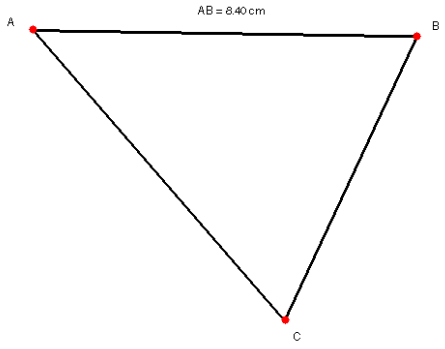

Figure 5.2

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19. Determine if point A is equidistant from B and C.

- **a.** From Check Property Toolbar, select **Equidistant**.
- **b.** Move the cursor toward point A until the message ***This point*** appears. Click once.
- **c.** Move the cursor toward point B until the message ***This point*** appears. Click once.
- **d.** Move the cursor toward point C until the message ***This point*** appears. Click once.
- **e.** A dotted box appears. Drag this box to a corner on the screen and click.

20. Is point A equidistant from points B and C?

_____

21. Using the pointer, drag point A around the screen.

22. Is point A equidistant from points B and C?

_____

23. Create the perpendicular bisector of segment $\overline{BC}$.

- **a.** From the Construct Toolbar, select **Perpendicular Bisector**.
- **b.** Move the cursor toward segment $\overline{BC}$ until the message ***Perpendicular bisector of this segment*** appears. Click once.

24. Does point A appear to be on the perpendicular bisector of $\overline{CB}$?

_____

25. Verify.

- **a.** From the Check Property Toolbar, select **Member**.
- **b.** Move the cursor toward point A until the message ***This point*** appears. Click once.
- **c.** Move the cursor toward the perpendicular bisector until the message ***This line*** appears. Click once.
- **d.** A dotted box appears. Drag this box to a corner on the screen and click.

26. Is point A a member of the perpendicular bisector?

_____

27. Using the pointer, drag point A around the screen.

28. Is point A still equidistant from points B and C?

_____

29. Is point A still a member of the perpendicular bisector?

_____

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30. What can you conclude about a point that is equidistant from the two endpoints of a segment?

_____

_____

_____

31. Clear the screen.

32. From the Line Toolbar, select **Ray**.

33. Create and label $\angle ABC$.

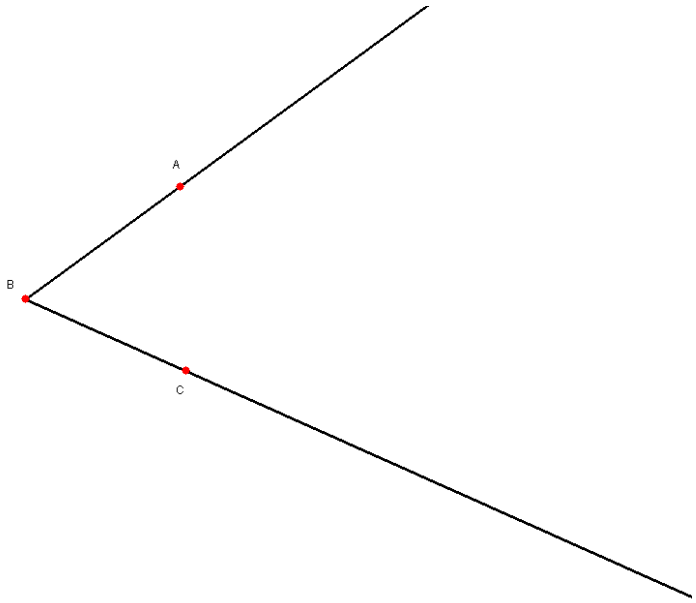

Figure 5.3

34. Create an angle bisector.

- **a.** From the Construct Toolbar, select **Angle Bisector**.
- **b.** Move the cursor to point A until the message ***This point*** appears. Click once.
- **c.** Move the cursor to point B until the message ***This point*** appears. Click once.
- **d.** Move the cursor to point C until the message ***This point*** appears. Click once.

35. Create a point on the angle bisector in the interior of the angle and label the new point D.

36. Measure the distance from point D to a side of the angle.

Note: The distance between a point and a line is measured on the perpendicular line connecting the point and the line.

- **a.** From the Construct Toolbar, select **Perpendicular Line**.
- **b.** Move the cursor to ray BA until the message ***Perpendicular to this ray*** appears. Click once.
- **c.** Move the pencil to point D until the message ***By this point*** appears. Click once.
- **d.** From the Points Toolbar, select **Intersection Point**.

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e. Create and label the point of intersection of the perpendicular line and ray *BA* point *E*.

f. Measure and label the distance *DE*.

g. From the Draw Toolbar, select **Hide And Show**.

h. Move the cursor to line $\overline{DE}$ until the message ***This line*** appears. Click once. The line becomes a dotted line and the next click of the mouse makes it disappear.

37. Repeat steps **36a** through **36h** to find the distance between point *D* and ray *BC*. Label the point of intersection *F*.

38. Record the following distances below:

DE = _____ *DF* = _____

39. Using the pointer, drag point *D* along the angle bisector.

40. Record the distances below:

DE = _____ *DF* = _____

41. How does the distance from point *D* to each side of the angle compare?

_____

42. Drag point *D* again and record the distances below:

DE = _____ *DF* = _____

43. What can you conclude about a point on the angle bisector of an angle?

_____

_____

_____

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