Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Unit 4 – GSP: Perpendicular and Angle Bisectors** Monica

Geometry Period:\_\_\_\_\_

Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Directions: Use Geometer’s Sketchpad to complete the constructions below. Then answer the questions based on your constructions.**

**Step 1:** Open Geometer’s Sketchpad.

**Step 2:** Draw segment AB.

**Step 3:** Construct the perpendicular bisector of AB by completing the following steps:

1. Construct the midpoint of AB. (Select segment AB and choose “Midpoint” under the “Construct” menu.) Label this point M.
2. Select the midpoint (M) and segment AB. Select “Perpendicular Line” under the “Construct” menu.

**Step 4:** Select the perpendicular line and select “Construct Point on Perpendicular Line” under the “Construct” menu. Label this point P.

**Step 5:** Measure the distance from point P to point A by selecting these points and choosing “Distance” under the “Measure” menu. Repeat this process with points P and B. Record your measurements below:

PA = \_\_\_\_\_\_\_\_\_\_\_ PB = \_\_\_\_\_\_\_\_\_\_\_

**Step 6:** Drag point P around and observe how the measurements change. (Drag points A and B as well.)

**QUESTION #1:** Complete the statement below based on what you observed.

If a point is on the perpendicular bisector of a segment, then it is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the endpoints of the segment.

**Step 7:** Open a new sketch by selecting “New Sketch” under “File.”

**Step 8:** Draw an angle by drawing two rays starting at the same point. Label your angle ABC with the vertex as B.

**Step 9:** Construct the angle bisector of angle ABC by selecting points A, B, and C (in that order) and selecting “Angle Bisector” under the “Construct” menu.

**Step 10:** Select the angle bisector and select “Point on Angle Bisector” under the “Construct” menu. Label this point D.

**Step 11:** Measure the distance from point D to each side of the angle. To do this, select point D and ray BA. Under the “Construct” menu select “Perpendicular Line.” Label the point of intersection as Y. Repeat this process with point D and ray BC. Label the point of intersection as Z.

**Step 12:** Measure the length of DY and DZ by selecting point D and point Y and selecting “Distance” under the “Measure” menu. Repeat this process for points D and Z. Record your measurements below:

DY = \_\_\_\_\_\_\_\_\_\_\_ DZ = \_\_\_\_\_\_\_\_\_\_\_

**Step 13:** Drag point D around and observe how the measurements change. (Drag points A and C as well.)

**QUESTION #2:** Complete the statement below based on what you observed.

If a point is on the bisector of an angle, then it is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the

sides of the angle.

**QUESTION #3:** Based on what you wrote in questions 2 and 3, complete the statements below.

* If a point is equidistant from the endpoints of a segment, then it is on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the segment.
* If a point in the interior of an angle is equidistant from the sides of the angle, then the point is on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**QUESTION #4:** Using the new information you just discovered, determine the value of x in each of the diagrams below. If there isn’t enough information, write “not enough information.”

|  |  |  |
| --- | --- | --- |
| a) | b) | c) |
| d) | e) | f) |