Name ______________________________

Exploring Perpendicular Bisectors

Directions: Follow the steps below. The page numbers refer to the TI-Nspire document *lesson03.*

1. Examine the sketch on page 1.1. Measure and record ∠AMP and ∠BMP.

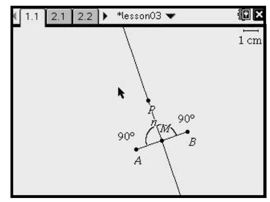
∠AMP = ______________________________

∠BMP = ______________________________

What do you observe about the angles?

____

Step 1



2. Measure the lengths of $\overline{AM}$ and $\overline{MB}$.

$\overline{AM}$ = ______________________________

$\overline{MB}$ = ______________________________

What do you observe about these lengths?

____

3. Measure the distances (lengths) $\overline{AP}$ and $\overline{PB}$.

$\overline{AP}$ = ______________________________

$\overline{PB}$ = ______________________________

What do you observe about these distances?

____

4. Slowly drag point P along perpendicular bisector *n*. What do you notice about distances AP and BP as you drag point P?

____

____

Exploring Perpendicular Bisectors *(cont.)*

Directions: Follow the steps below. The page numbers refer to the TI-Nspire document *lesson03.*

5. Define *perpendicular*.

____

____

6. Define *bisect*.

____

____

7. Define the *perpendicular bisector of a segment*.

____

____

8. Drag point P until it appears to sit on point M. Point M is the midpoint of $\overline{AB}$. Is point M on perpendicular bisector *n*? How do you know?

____

____

____

____

9. What special property is true of any point located on the perpendicular bisector of a segment?

____

____

____

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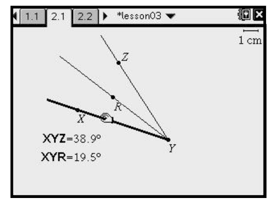
Name ________________________________

Exploring Angle Bisectors

Directions: Follow the steps below. The page numbers refer to the TI-Nspire document *lesson03.*

1. Examine the sketch on page 2.1. Grab $\overrightarrow{YX}$ (the ray itself, not a point). Drag it to make ∠XYZ larger and then smaller. This will capture the measures of ∠XYZ and ∠XYR and will calculate the ratio between them.

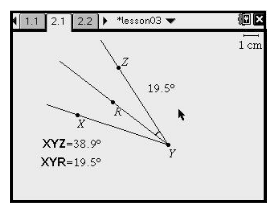
Step 1



2. Now, examine the data in the spreadsheet on page 2.2. After examining the sketch and spreadsheet, what is the relationship between ∠XYZ and ∠XYR?

3. On page 2.1, measure ∠RYZ. What is the relationship between this angle and the others?

Step 3



4. $\overrightarrow{YR}$ is considered the angle bisector of ∠XYZ. What is the definition of *angle bisector*?

Exploring Angle Bisectors *(cont.)*

Directions: Follow the steps below. The page numbers refer to the TI-Nspire document *lesson03.*

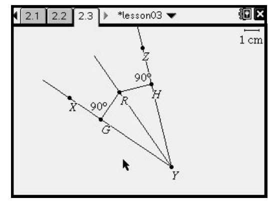
5. Examine the sketch on page 2.3. Drag point R, and observe the angle formed by $\overline{RG}$ and $\overrightarrow{YX}$. What do you observe about the angle?

____

____

____

Step 1



6. Measure the lengths of $\overline{RG}$ and $\overline{RH}$. What do you observe about the lengths?

____

____

7. Slowly drag point R, and observe how the lengths of $\overline{RG}$ and $\overline{RH}$ change. Describe what you observe.

____

____

8. What special property is true of any point located on the bisector of an angle?

____

____

9. Complete the statement below.

The Angle Bisector Theorem states that any point on the bisector of an ________ is equidistant from ____________________________. So, point R is the same distance from $\overrightarrow{YX}$ as from $\overrightarrow{YZ}$ anywhere along angle bisector $\overline{YR}$.

Name ________________________________

Proving Angle Bisectors

Directions: The Angle Bisector Theorem, in order to truly be a theorem, needs to be proven using definitions, postulates, and theorems that have already been proven. Plan and write the proof of this theorem in any form (paragraph, two-column, or flowchart).

- **Given:** any point on the bisector of an angle
- **Show:** the point is equidistant from the sides of the angle
- **Hint:** The proof depends on Side-Angle-Angle (SAA) congruence.

