Common Core -   **Lesson 4**

Opening Exercise

Materials

1. Plain Paper with a pre designed right angle printed on it
2. Patty Paper

Opening - (Warm Up)

Hand out to students, as they are entering class, a precut piece of patty paper and a precut piece of plain copy paper with a pre designed right angle printed on it.

Directions will read:

"Construct an angle bisector. When completed place the piece of patty paper over the bisected angle Trace the angle and bisector. Remove the patty paper and fold along the angles bisector."

Answer the following question:

1. Did the angles ray's overlap exactly? Why or why not?

Discussion

In Lesson 3 we studied how to construct an angle bisector. We know we can verify the construction by folding an angle along the bisector. A correct construction means one half of the original angle will coincide exactly with the other half so that each point of one ray of the angle maps onto a corresponding point on the other ray of the angle.

We now extend this observation. Imagine a segment that joins any pair of points that map onto each other when the original angle is folded along the bisector. The following figure illustrates two such segments:
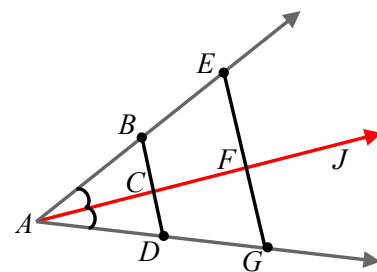
Teacher Observation Rubric

Needs Improvement	Satisfactory	Excellent
Few construction arcs visible	Some construction arcs visible	Construction arcs visible and appropriate
Few vertices or relevant intersections labeled	Most vertices and relevant intersections labeled	All vertices and relevant intersections labeled
Lines drawn without straightedge or not drawn correctly	Most lines neatly drawn with straightedge	Lines neatly drawn with straightedge
Fewer than 3 angle bisectors constructed correctly	3 of the 4 angle bisectors constructed correctly	Angle bisector constructed correctly

Directions

Construct an angle bisector. When completed place the piece of patty paper over the bisected angle Trace the angle and bisector. Remove the patty paper and fold along the angles bisector.
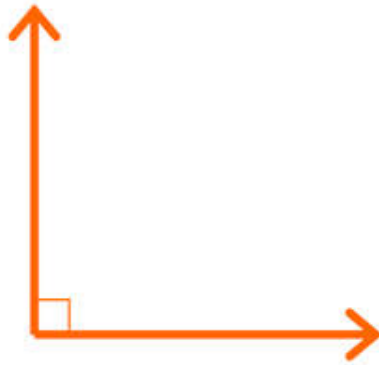
Answer the following question:

2. Did the angles ray's overlap exactly? Why or why not?

Construct Perpendicular Bisector

Module 1: Lesson 4 Classwork

Relevant Vocabulary:

Right Angle:

Perpendicular:

Equidistant:
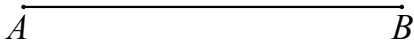
Day 1

Example 1: Construct a perpendicular bisector of a line segment.

**STEPS**

A B

Example 2: Now that you are familiar with the construction of a perpendicular bisector, we must make one last observation. Using your compass, string, or patty paper, examine the following pairs of segments:

    I. $\overline{AC}, \overline{BC}$

    II. $\overline{AD}, \overline{BD}$

    III. $\overline{AE}, \overline{BE}$

Based on your findings, fill in the observation below.

Observation:

Any point on the perpendicular bisector of a line segment is _____ from the endpoints of the line segment.

C

D

A B

E
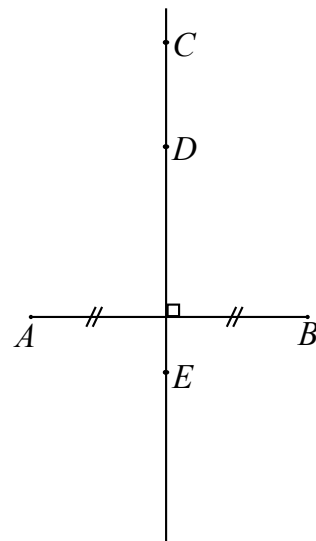
Example 3: Now that you know how to construct the perpendicular bisector of a segment investigate how to construct a perpendicular to a line ℓ from a point A not on ℓ. **Think about how you have used circles in constructions so far and *why* the perpendicular bisector construction works the way it does.** There are 5 steps to this construction. A copy of what the finalized construction will be provided for you along with the first step of the construction. You will need to discover and write the remaining steps. ***(You may do this with your group or individually)**

$A.$

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Record the remaining _STEPS_ below

1. Draw circle A: center A, with radius so that circle A intersects line ℓ in two points.

2._____

3. _____

4. _____

5. _____

Name_____

Divide the following segment AB into 4 segments of equal length.
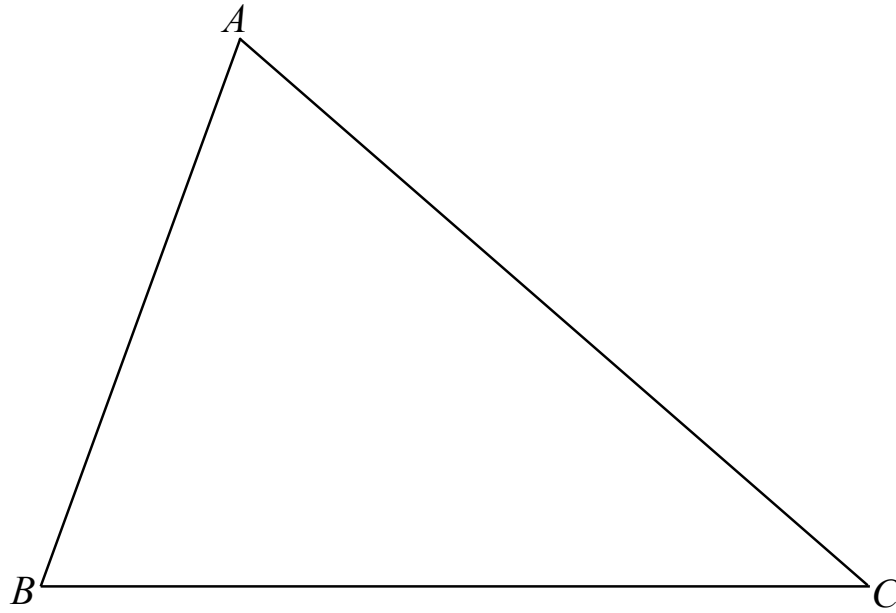
_____

Day 2

Example 4: Construct parallel lines

To construct parallel lines ℓ_1 and ℓ_2:

I.   Construct a perpendicular line ℓ_3 to a line ℓ_1 from a point A not on ℓ_1.

II. Construct a perpendicular line ℓ_2 to ℓ_3 through point A. *Hint:* Use the steps behind Lesson 3, to accomplish this.

$A_{\bullet}$

ℓ_1 ————————————————————

2.   **Example 5:** Construct the perpendicular bisector of $\overline{AB}$, $\overline{BC}$, and $\overline{CA}$ on the triangle below.

1. What do you notice about the segments you have constructed?

2. **Example 6:** Two homes are built on a plot of land. Both homeowners have dogs, and are interested in putting up as much fencing as possible between their homes on the land, but in a way that keeps the fence equidistant from each home. Use your construction tools to determine where the fence should go on the plot of land.

$$H_2$$

$$H_1$$
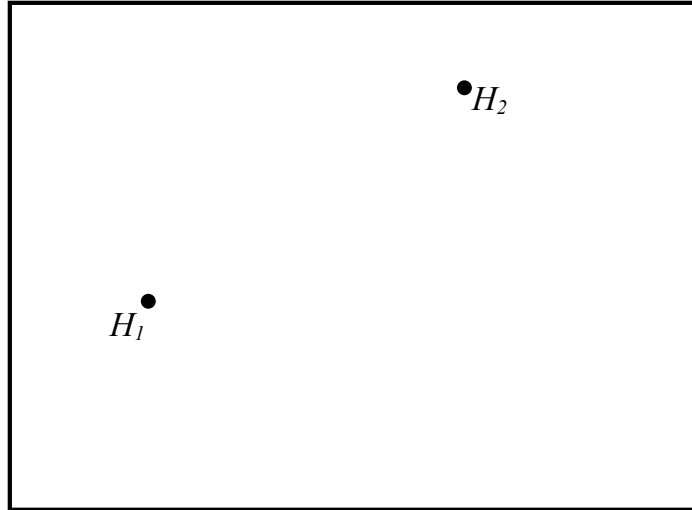
Using the last Example question (EXAMPLE 6) answer the following question

1. How will the fencing alter with the addition of a third home?

$$\bullet H_2$$

$$H_1 \bullet$$

$$\bullet H_3$$