

Geometry CC - Unit 4  
Lesson 2: Reflections  
M1 L14 Day 2 Homework: 4.2 # 15

HW Answers 4.2 Day 1

Use the diagram to complete the statement. (Figure  $ABCD \rightarrow EFGD$ )

- $\overline{AB} \rightarrow \overline{EF}$
- $\angle DAB \rightarrow \angle DEF$
- $C \rightarrow G$
- $D \rightarrow D$
- $\angle ACB \rightarrow \angle GFE$
- $\overline{DC} \rightarrow \overline{DG}$

Decide whether the conclusion is true or false. If false, give the correct coordinate. (You do not have to graph, but you can if it helps.)

- If  $N(2, 4)$  is reflected across the line  $y = x$ , then  $N'$  is  $(4, 2)$ .  
True
- If  $M(6, -2)$  is reflected across the line  $x = 3$ , then  $M'$  is  $(6, -2)$ .  
True
- If  $W(-6, 3)$  is reflected over the  $y$ -axis, then  $W'$  is  $(-6, 3)$ .  
False  $W'$  is  $(6, 3)$
- If  $Z(2, 0)$  is reflected over the  $x$ -axis, then  $Z'$  is  $(2, 0)$ .  
True

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Use the diagram at the right to name the image of  $\overline{AB}$  after the reflection given.

- Reflection over the  $x$ -axis.  
 $\overline{GH}$
- Reflection over the  $y$ -axis.  
 $\overline{CD}$
- Reflection over the line  $y = x$   
None of them
- Reflection over the  $y$ -axis followed by a reflection over the  $x$ -axis.  
 $\overline{EF}$

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**Reflection Over a Line:**

-If a point is on the line of reflection, the preimage is equal to the image.

-If a point is not on the line of reflection, the line of reflection is a perpendicular bisector of the segment joining the two points.

-Therefore, each point of the preimage is the same distance from the line of reflection as the corresponding point on the image.

*Remember: Reflections are an isometry (Length and Angle Measure are preserved), but the orientation is different from the preimage to the image.*

Orientation is not preserved

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**Exploratory Example**

Use your compass and straightedge to construct the perpendicular bisector of each of the segments connecting  $A$  to  $A'$ ,  $B$  to  $B'$ , and  $C$  to  $C'$ . What do you notice about these perpendicular bisectors?

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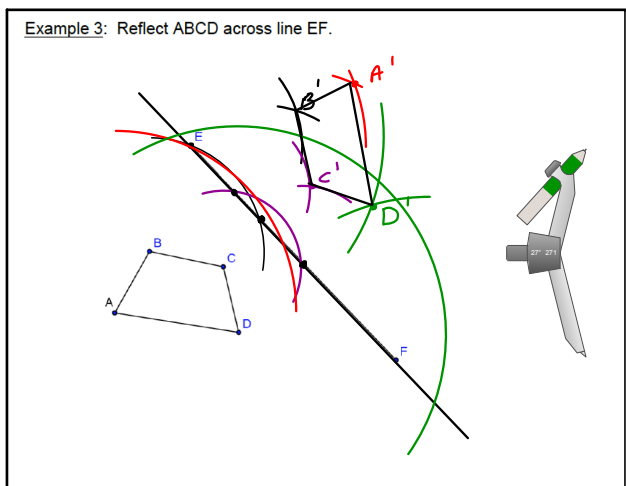
**Example 1:** Construct the segment that represents the line of reflection for quadrilateral  $ABCD$  and its image  $A'B'C'D'$ . What is true about each point on  $ABCD$  and its corresponding point on  $A'B'C'D'$ ?

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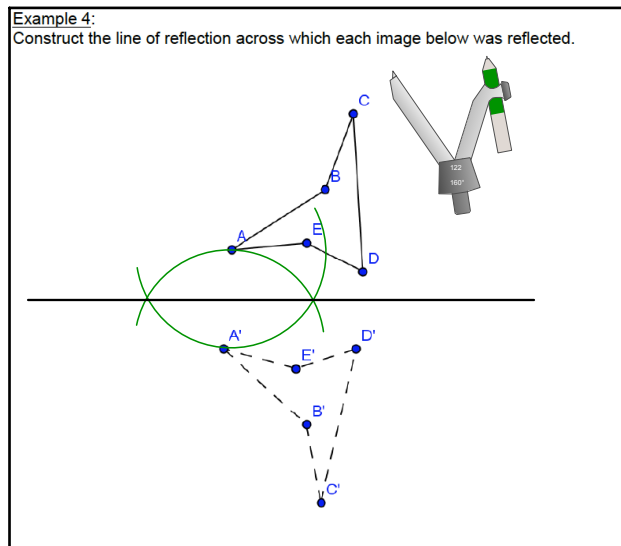
**Example 2:** Construct the reflection of  $\triangle ABC$  over line  $DE$ . Follow the steps below to get started and then complete the construction on your own.

- Construct circle  $A$ : center  $A$ , with radius such that the circle crosses  $\overline{DE}$  at two points (labeled  $F$  and  $G$ ).
- Construct circle  $F$ : center  $F$ , radius  $FA$  and circle  $G$ : center  $G$ , radius  $GA$ . Label the [unlabeled] point of intersection between circles  $F$  and  $G$  as point  $A'$ . This is the reflection of vertex  $A$  across  $\overline{DE}$ .
- Repeat steps 1 and 2 for vertices  $B$  and  $C$  to locate  $B'$  and  $C'$ .
- Connect  $A'$ ,  $B'$ , and  $C'$  to construct the reflected triangle.

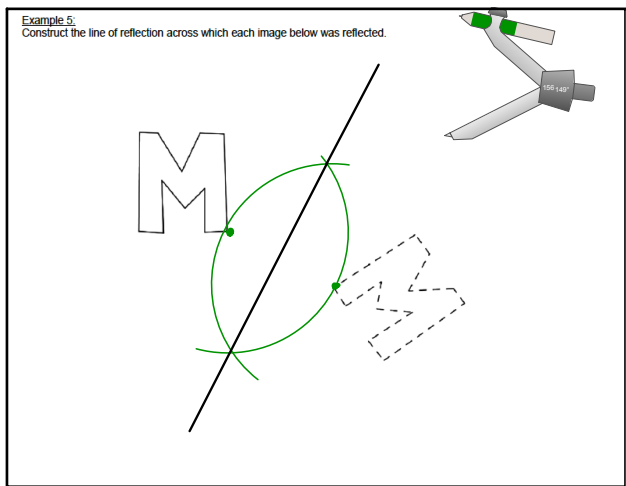
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