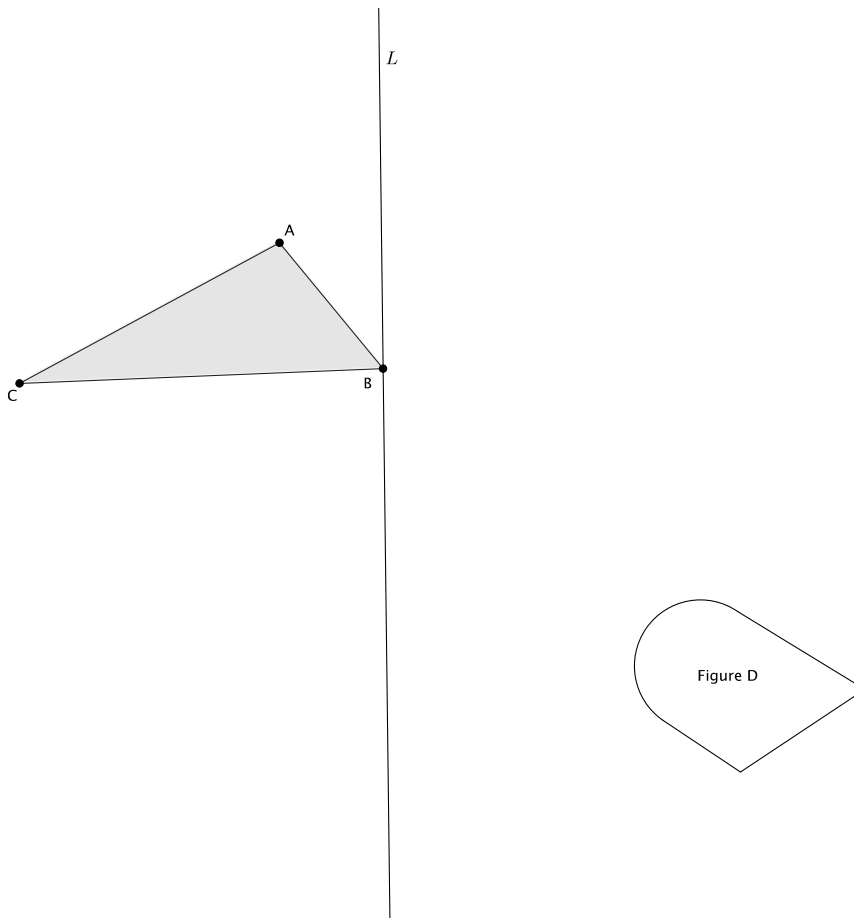# Lesson 4: Definition of Reflection and Basic Properties
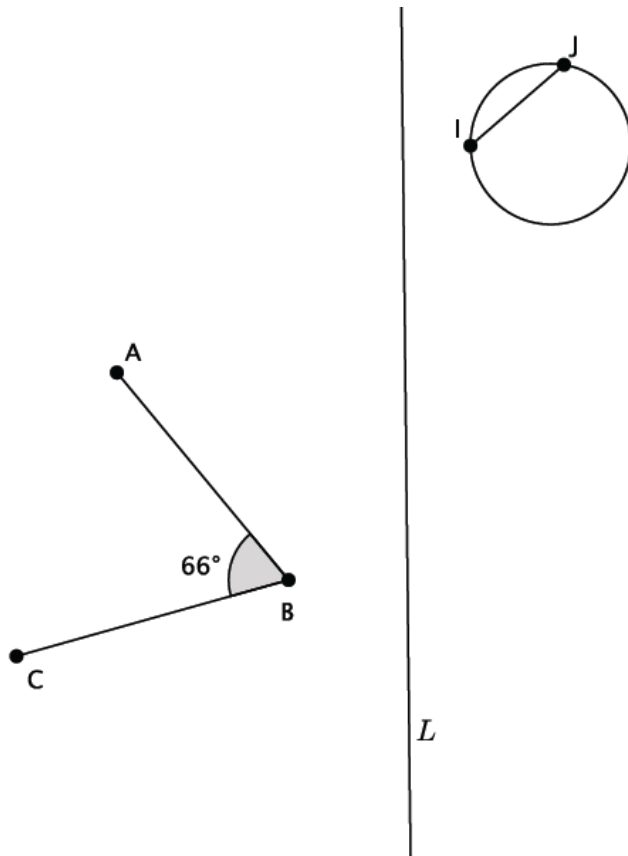
Classwork

Exercises

1. Reflect $\triangle ABC$ and Figure D across line L. Label the reflected images.

2. Which figure(s) were not moved to a new location on the plane under this transformation?

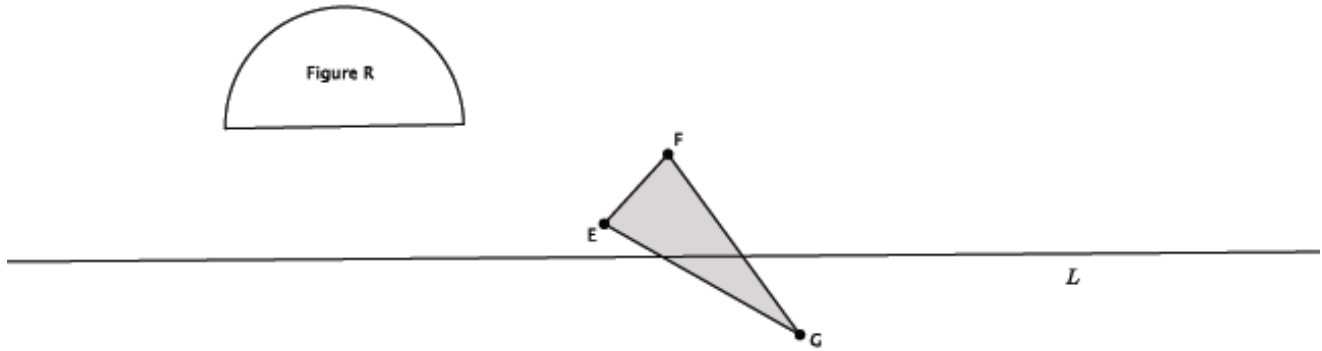3. Reflect the images across line L. Label the reflected images.

4. Answer the questions about the image above.

    a. Use a protractor to measure the reflected $\angle ABC$. What do you notice?

    b. Use a ruler to measure the length of IJ and the length of the image of IJ after the reflection. What do you notice?

5.   Reflect Figure R and ΔEFG across line L. Label the reflected images.

Figure R

F

E

L

G

Basic Properties of Reflections:

(Reflection 1) A reflection maps a line to a line, a ray to a ray, a segment to a segment, and an angle to an angle.
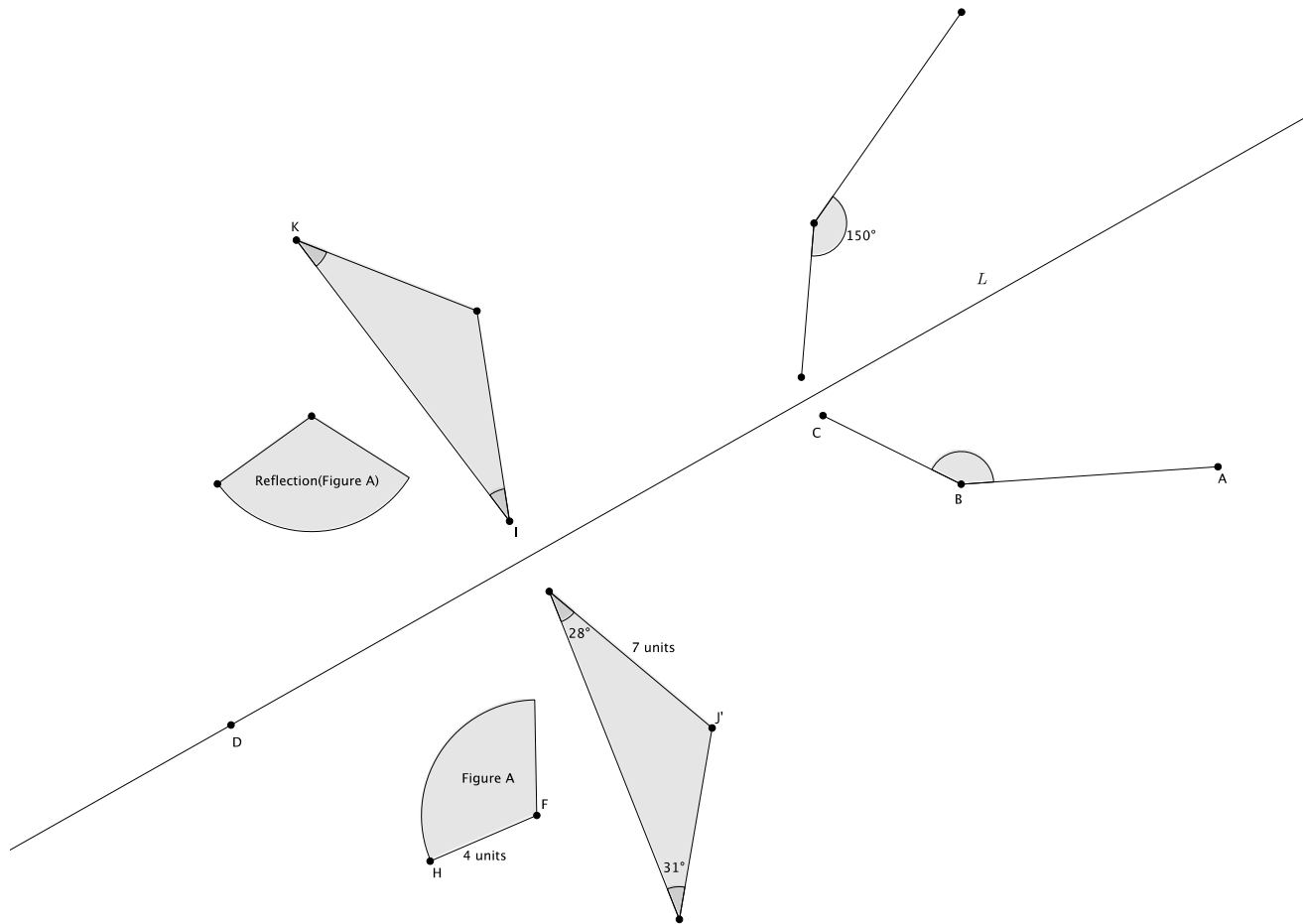
(Reflection 2) A reflection preserves lengths of segments.

(Reflection 3) A reflection preserves measures of angles.

If the reflection is across a line L and P is a point not on L, then L bisects the segment PP', joining P to its reflected image P'. That is, the lengths of OP and OP' are equal.

A

P' O P

L
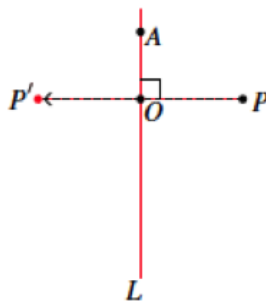
Use the picture below for Exercises 6–9.

6. Use the picture to label the unnamed points.

7. What is the measure of $\angle JKI$? $\angle KIJ$? $\angle ABC$? How do you know?

8. What is the length of segment $Reflection(FH)$? IJ? How do you know?

9. What is the location of $Reflection(D)$? Explain.

<div style="border:1px solid #4a90d9; padding:10px;">

Lesson Summary

- A reflection is another type of basic rigid motion.
- Reflections occur across lines. The line that you reflect across is called the line of reflection.
- When a point, P, is joined to its reflection, P', the line of reflection bisects the segment, PP'.

</div>

Problem Set

1. In the picture below, $\angle DEF = 56°$, $\angle ACB = 114°$, $AB = 12.6$ units, $JK = 5.32$ units, point E is on line L, and point I is off of line L. Let there be a reflection across line L. Reflect and label each of the figures, and answer the questions that follow.
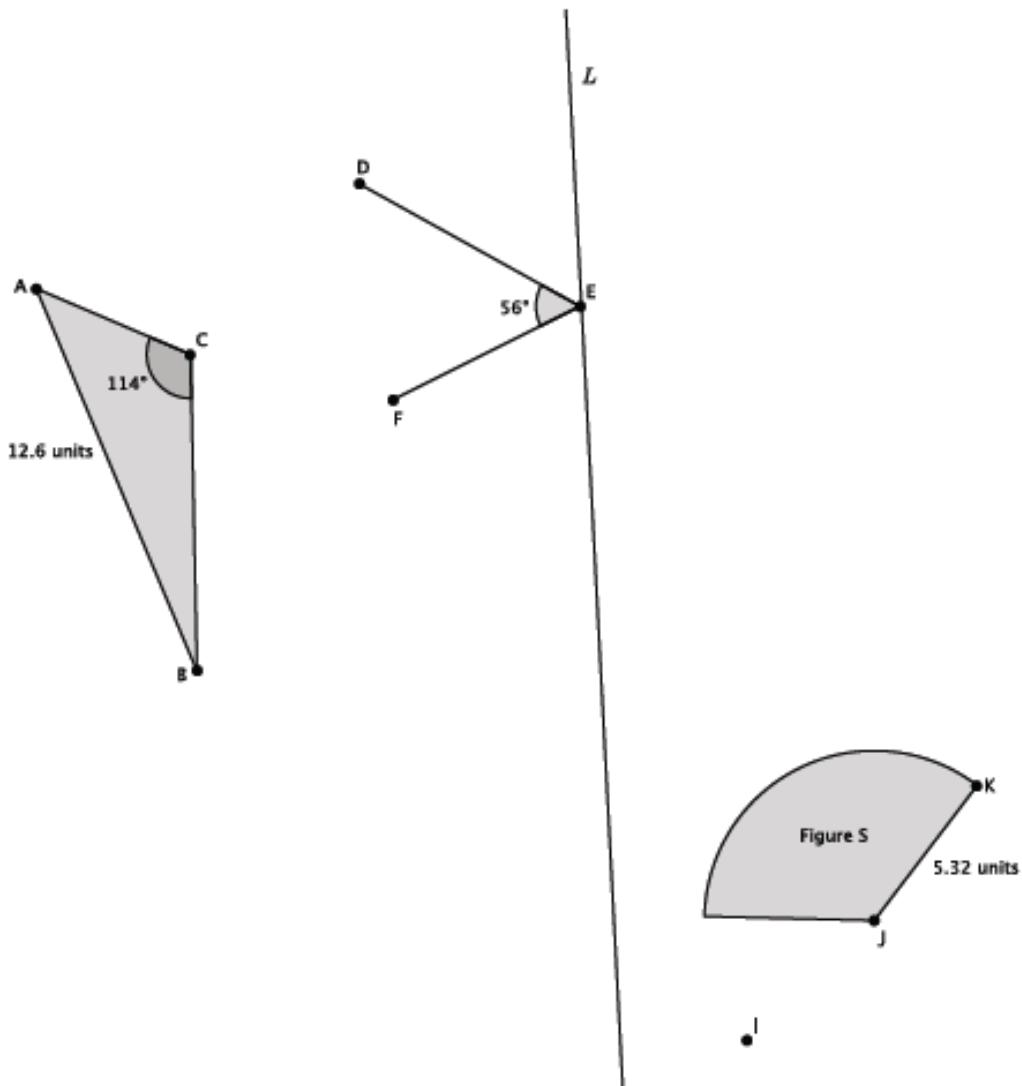
2. What is the measure of $Reflection(\angle DEF)$? Explain.

3. What is the length of $Reflection(JK)$? Explain.

4. What is the measure of $Reflection(\angle ACB)$?

5. What is the length of $Reflection(AB)$?

6. Two figures in the picture were not moved under the reflection. Name the two figures and explain why they were not moved.

7. Connect points I and I'. Name the point of intersection of the segment with the line of reflection point Q. What do you know about the lengths of segments IQ and QI'?