Lesson 2.03 Reflections

Students will be able to:

- Content Objective: Define reflection more closely and reflect an image over a line.
- Language Objective: Discuss the role perpendicular bisectors play in reflections.

Warm Up

Label the following diagram using the word bank provided. Not all words will be used.

$$R_{C,-30°}(\Delta BAT) = \Delta B'A'T'$$

Word Bank

Clockwise
Counterclockwise
Reflection
Pre-image
Center of Rotation
Image
Rotation

Vocabulary Review

True or False. Identify whether each of the following statements is true or false by writing "T" for true and "F" for false.

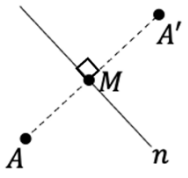
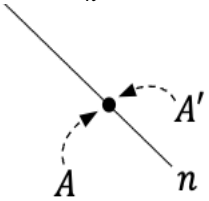
1. _____ The notation $R_{G,65°}(A)$ represents a rotation of point A rotated about point G 65° clockwise.
2. _____ Rotations preserve distance and angle measure.
3. _____ Rigid Motions are transformations that preserve distance and angle measure.
4. _____ A rotation is not a rigid motion.

Graphic Organizer

Line Reflection

$r_n(A) = A'$
Reflect point A over line n to get A'

A line reflection requires a line and knowledge of perpendicular bisectors.

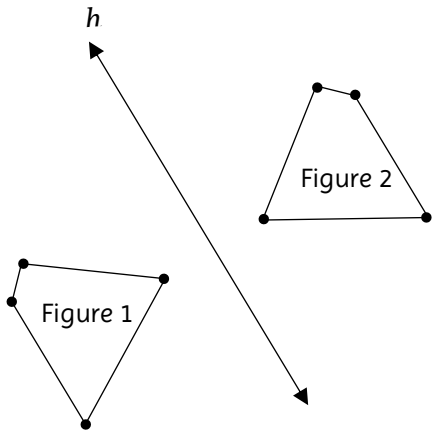
Point A not on line n	Point A on line n
- $\overline{AA'} \perp n$ - $\overline{AA'}$ intersects n at its midpoint, M. $\overline{AM} \cong \overline{A'M}$ 	The reflection of point A is itself i.e., $r_n(A) = A$ 

Skill 1: Properties of Reflections

Figure 1 is reflected over line h to get Figure 2 shown in the illustration shown below.

a. Construct $\overline{YY'}$. Line h and $\overline{YY'}$ intersect to form what type of angles?

b. What parts of Figure 1 are preserved after it is transformed to get Figure 2? Use measurement to justify your answer.



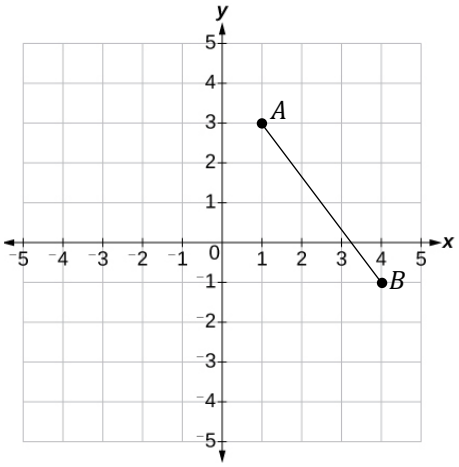
Exercise 1: Properties of Reflections

$\overline{AB}$ is shown graphed below.

a. Draw the image $\overline{A'B'}$ after the transformation $r_{y-axis}(\overline{AB}) = \overline{A'B'}$.

b. What are the coordinate of A' and B'? How do these points compare to the points of A and B?

c. What is true about the lengths of $\overline{AB}$ and $\overline{A'B'}$?



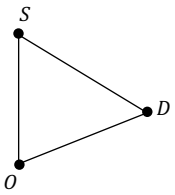
d. Based on your answers above, what type of transformation are reflections?

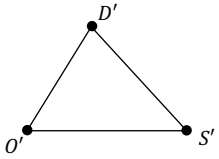
Constructing Line of Reflection

1. Connect any pair of corresponding vertices of the pre-image and image.
2. Construct the perpendicular bisector of this line segment.
3. Label the perpendicular bisector above as the line of reflection.

Skill 2: Constructing Line of Reflection

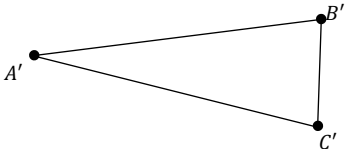
ΔSOD is reflected to get $\Delta S'O'D'$. Use a compass and straightedge to construct the line of reflection.

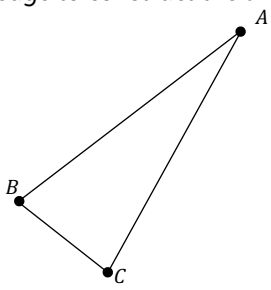




Exercise 2: Constructing Line of Reflection

ΔABC is reflected to get $\Delta A'B'C'$. Use a compass and straightedge to construct the line of reflection.



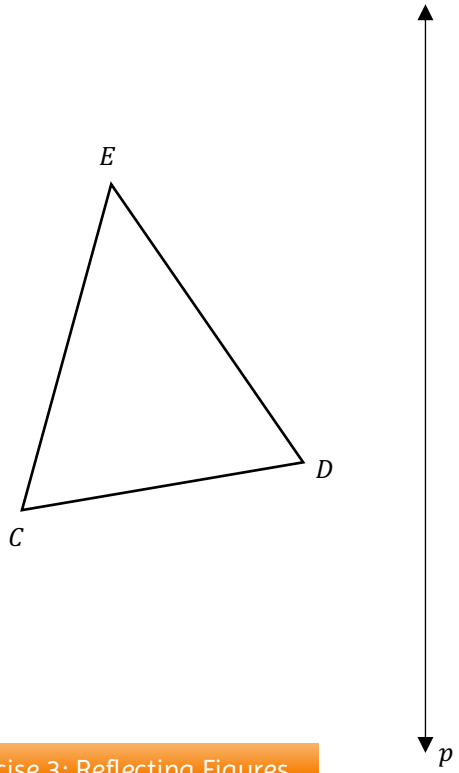


Constructing Reflections

1. Start at one point of the pre-image you wish to reflect and construct a line through the point perpendicular to the line of reflection.
2. Repeat step 1 at all other vertices.
3. Mark all intersection points of the perpendicular lines.
4. Connect intersections points with lines segments and label the image.

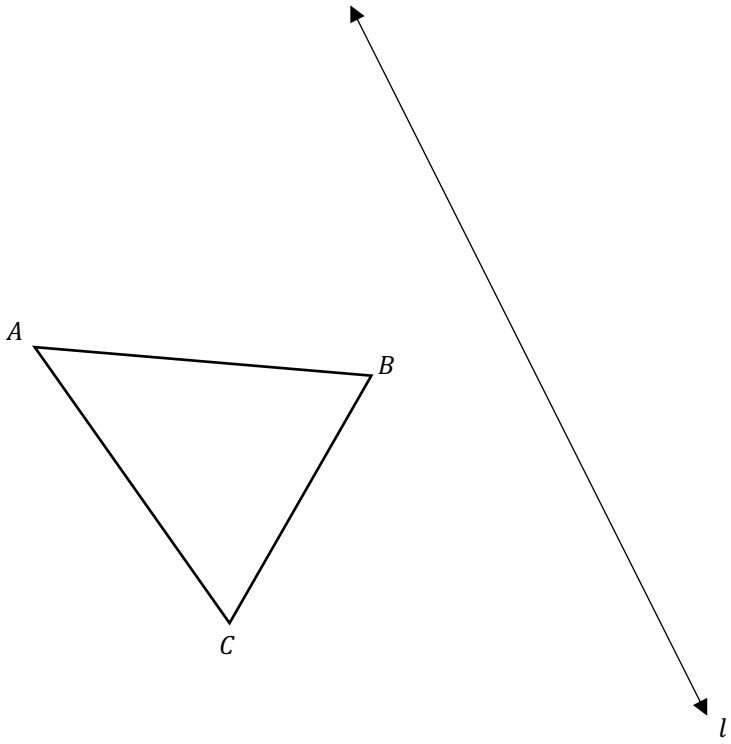
Skill 3: Reflecting Figures

Construct the image of ΔCDE after the transformation $r_p(\Delta CDE) = C'D'E'$. Be sure to label the image and leave all construction marks.



Exercise 3: Reflecting Figures

Construct the image of ΔABC after the transformation $r_l(\Delta ABC) = A'B'C'$. Be sure to label the image and leave all construction marks.



2.03- Problem Set

Name: _____

1. Identify the transformations shown below based on the given the notations. Be specific.

   a. $r_j(\Delta BAT) = B'A'T'$ b. $r_{x-axis}(\overline{QR}) = \overline{Q'R'}$ c. $R_{O,90°}(\Delta XYZ) = \Delta X'Y'Z'$

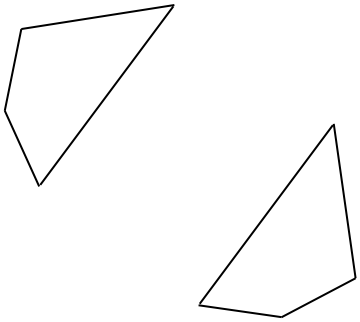
2. **True or False.** Identify whether the statements below are true or false.

   a. _____ Reflections are rigid motions.

   b. _____ To construct the line of reflection, connect any two vertices of the pre-image and image and construct the perpendicular bisector.

   c. _____ A reflection transforms a figure into its mirror image.

3. Given the figures below, construct the line of reflection.



4. Gina reflected ΔPON over the given line below and lost track of corresponding points. Help Gina by labeling the corresponding points of the image of ΔPON based on the construction marks shown as points $P'O'N'$.