

## LESSON 2

## TASK ANALYSIS

Step	(✓)	Task
STEP 1		Listen to or read the math story.
STEP 2		Identify the problem.
STEP 3		Plot the original figure(s) on the coordinate plane.
STEP 4		Plot the transformed figure(s) on the coordinate plane.
STEP 5		Identify the transformations on the coordinate plane.
STEP 6		State the solution to the math story problem.
STEP 7		Fill in the big ideas.

STEP  
1

Read the math story.

## Painting with Transformations

Maria is an artist. She is painting a landscape picture. She has already painted some mountains, but she wants to reflect the mountain in the lake below it. The reflection must match the mountain exactly. She also painted a bird on the ground. She wants to paint another bird just like it to look like the bird has taken flight.

**Figure 1:** Maria plotted the points of the first figure using these coordinates:  $(1, 2)$ ,  $(3, 2)$ , and  $(5, 2)$ . She connected the points with curved lines. To transform the figure, she plotted these coordinates  $(5, 6)$ ,  $(7, 6)$ , and  $(9, 6)$ . She connected these points with curved lines.

**Figure 2:** Maria plotted these coordinates for the second figure:  $(-10, 0)$ ,  $(-7, 6)$ ,  $(-5, 2)$ ,  $(-3, 6)$ , and  $(0, 0)$ . She connected these points with straight lines. To transform this figure, she plotted these coordinates  $(-10, 0)$ ,  $(-7, -6)$ ,  $(-5, -2)$ ,  $(-3, -6)$ , and  $(0, 0)$ . She connected these points with straight lines.

What types of transformations did Maria use?

STEP  
2

Identify the problem.



STEP  
3

Plot the original figure(s).



STEP  
4

Plot the transformed figure(s).



STEP  
5

Identify the transformations.

Figure 1

**Original**

$(1, 2)$   $(3, 2)$   $(5, 2)$

**Transformed**

$(5, 6)$   $(7, 6)$   $(9, 6)$

Figure 2

**Original**

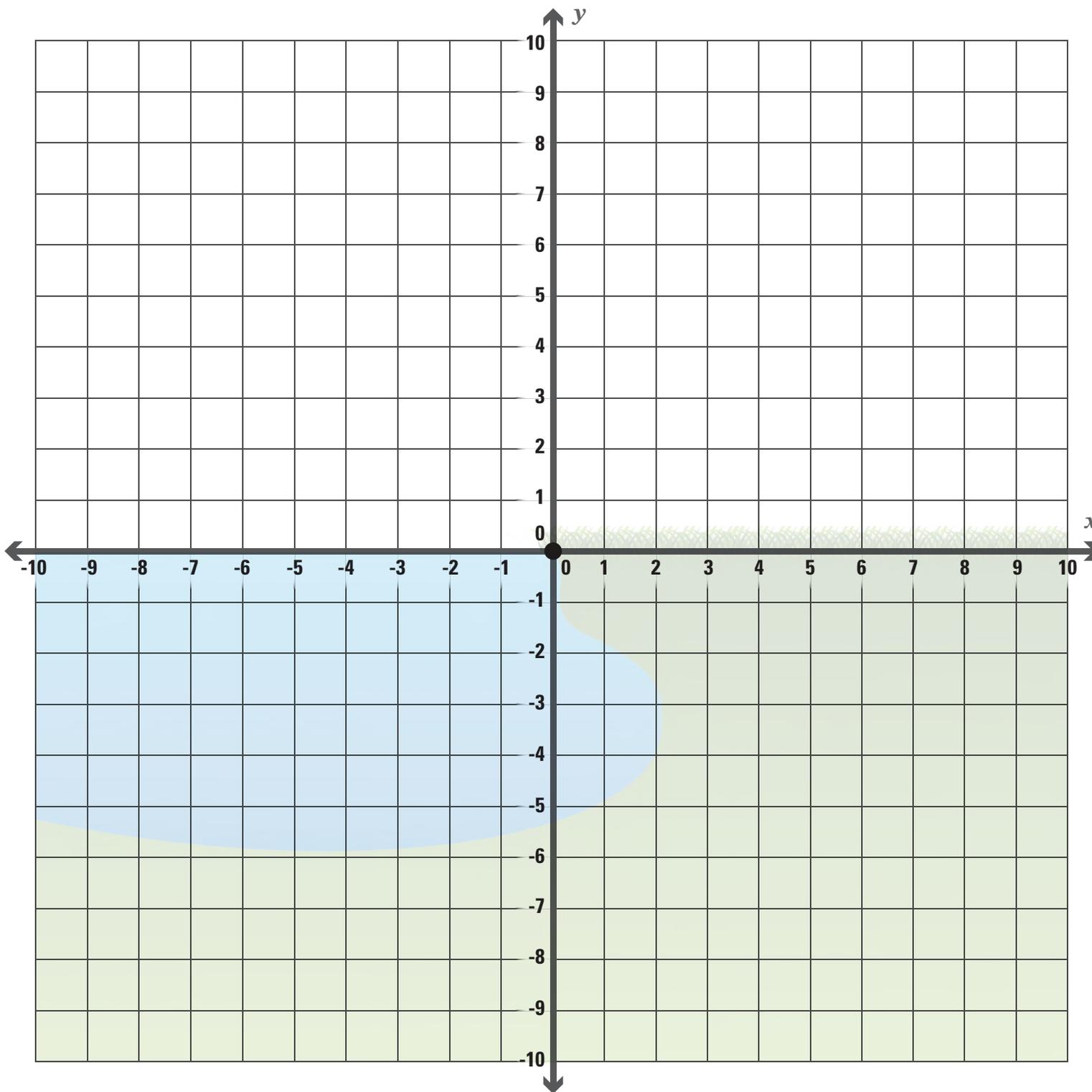
$(-10, 0)$   $(-7, 6)$

$(-5, 2)$   $(-3, 6)$   $(0, 0)$

**Transformed**

$(-10, 0)$   $(-7, -6)$

$(-5, -2)$   $(-3, -6)$   $(0, 0)$





State the solution to the math story problem.

Maria used a **reflection translation** for the bird

and a **reflection translation** for the mountains.

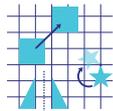


Fill in the big ideas.

A \_\_\_\_\_ is a movement of a shape on a plane.

A translation \_\_\_\_\_ and a reflection \_\_\_\_\_.

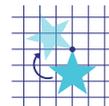
Word Bank



transformation



flips



rotation

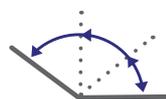


slides

# GLOSSARY

SYMBOLS

$\angle ABC$ angle	$\cong$ is congruent to	$90^\circ$ degree
$\sim$ similar to	$\triangle LMN$ triangle	



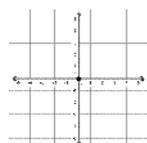
**angle:** the amount of space between two lines that intersect at a given point



**clockwise:** moving in the direction of the hands on a clock



**congruent triangles:** identical triangles with exactly the same three sides and the same three angles



**coordinate plane:** a plane containing an  $x$ -axis and a  $y$ -axis

$(x, y)$

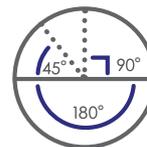
**coordinates  $(x, y)$ :** pairs of numbers that tell an exact position



**counterclockwise:** moving in the opposite direction of the hands on a clock



**definition:** in proofs, a description of a shape or its attributes



**degree:** a measure of the size of an angle



**diagonal:** a line segment that goes from one corner to another, but is not an edge

$x + y = z$

**equation:** an expression that two expressions are equal

# GLOSSARY



**flip:** to turn something over



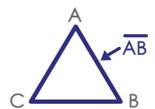
**given:** facts that are told in the information about the problem



**horizontal:** going side to side like the horizon



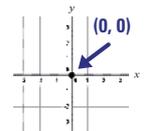
**interior angle:** the angle inside a shape



**line segment:** a line between two points (named by the points on each end)



**negative number:** a number less than zero



**origin point:** the point where the  $x$ -axis and the  $y$ -axis meet  $(0, 0)$



**positive number:** a number greater than zero



**postulate:** a statement that everyone agrees is true without the need for proof



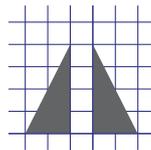
**proof:** logical arguments used to show the truth of a mathematical statement



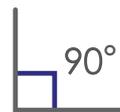
**property:** a characteristic or attribute something like a shape has



**reason:** a statement or fact that explains why something is the way it is



**reflection:** a flip of a shape to create a mirror image

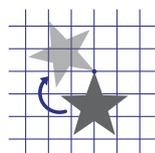


**right angle:** an angle of  $90^\circ$

# GLOSSARY



**right triangle:** a triangle with a right angle



**rotation:** a circular movement around a point



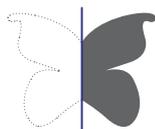
**similar triangles:** triangles that have the same size interior angles; the lengths of their sides may be different



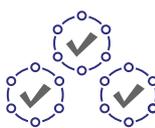
**slide:** to move a shape without turning it or flipping it



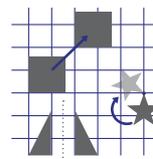
**statement:** information about a shape's measurements and properties learned by observing the shape



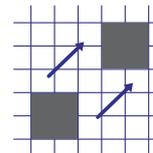
**symmetry:** another name for reflection; when one half is a reflection of the other half



**theorem:** a result that has been proved to be true (using operations and known facts)



**transformation:** changing a shape using a turn, a flip, or a slide



**translation:** a slide of a shape horizontally, vertically, or diagonally



**triangle:** a shape with 3 sides and 3 angles



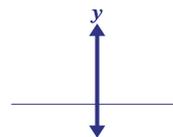
**turn:** to rotate around a point



**vertical:** going in an up and down direction, upright



**x-axis:** a line on a graph that runs horizontally (left-to-right)



**y-axis:** a line on a graph that runs vertically (up and down)