

Coffman Blizzard Bag #1

8th Grade Math

Learning Targets

- I can reflect, translate, and rotate a figure in a coordinate grid.

Directions

Please use your notes and study guide papers that I have attached to help you complete the WKST on transformations. If you are unable to print the papers, please use a separate sheet of paper to write the new coordinates of the figure.

Standards

8.G.1a

Verify experimentally the properties of rotations, reflections, and translations:

- a) Lines are taken to lines, and line segments to line segments of the same length.

Study Guide

For use with pages 402–408

GOAL Reflect figures and identify lines of symmetry.

VOCABULARY

A **reflection** creates a mirror image of each point of a figure.

A **transformation** is an operation that changes a figure into another figure.

An **image** is the new figure created by a transformation.

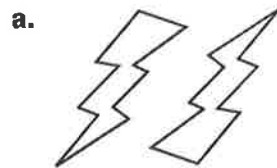
A figure has **symmetry** if one half of the figure is a mirror image of the other half.

To reflect a point in the x -axis, multiply its y -coordinate by -1 .

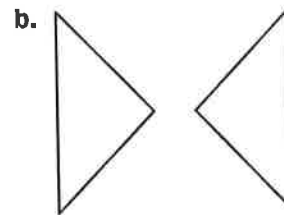
To reflect a point in the y -axis, multiply its x -coordinate by -1 .

EXAMPLE 1 Identifying a Reflection

Tell whether the picture shows a reflection.



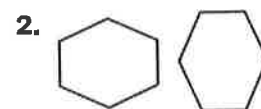
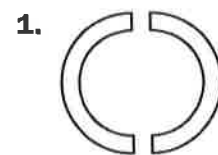
The figure is *not* a reflection.



The figure is a reflection.

Exercises for Example 1

Tell whether the picture shows a reflection.

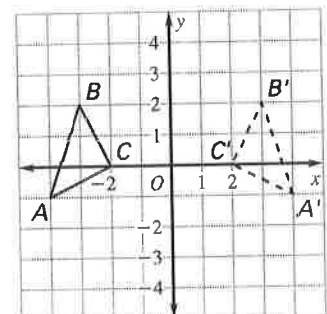


EXAMPLE 2 Reflection in the y -Axis

Triangle ABC has been reflected in the y -axis. Write the coordinates of each vertex of ABC and its image $A'B'C'$.

Solution

Original		Image
$A(-4, -1)$	\rightarrow	$A'(4, -1)$
$B(-3, 2)$	\rightarrow	$B'(3, 2)$
$C(-2, 0)$	\rightarrow	$C'(2, 0)$



Study Guide

For use with pages 402-408

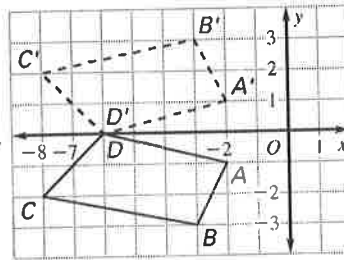
EXAMPLE 3 Reflecting in the x-Axis

Reflect quadrilateral $ABCD$ in the x -axis.

Solution

Multiply each y -coordinate by -1 .

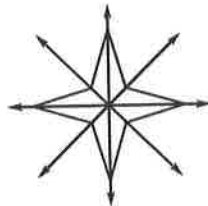
Original		Image
(x, y)	\rightarrow	$(x, -y)$
$A(-2, -1)$	\rightarrow	$(-2, 1)$
$B(-3, -3)$	\rightarrow	$(-3, 3)$
$C(-8, -2)$	\rightarrow	$(-8, 2)$
$D(-6, 0)$	\rightarrow	$(-6, 0)$



EXAMPLE 4 Identifying a Line of Symmetry

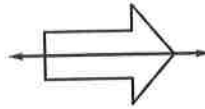
How many lines of symmetry does the figure have?

a.



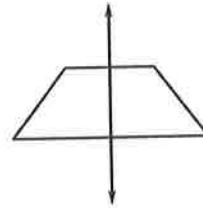
four lines of symmetry

b.



one line of symmetry

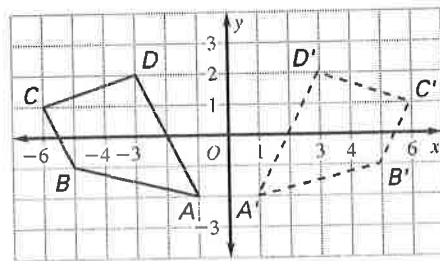
c.



one line of symmetry

Exercises for Examples 2, 3, and 4

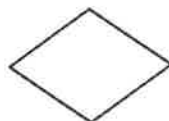
3. Quadrilateral $ABCD$ has been reflected in the y -axis. Write the coordinates of each vertex of quadrilateral $ABCD$ and its image $A'B'C'D'$.



4. Graph the triangle with vertices, $A(2, 1)$, $B(7, 2)$, and $C(9, 0)$. Reflect the triangle in the x -axis and graph its image.

How many lines of symmetry does the figure have?

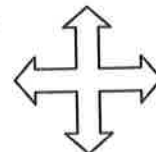
5.



6.



7.



Study Guide

For use with pages 409–413

GOAL Translate or rotate figures in a coordinate plane.

VOCABULARY

A **translation**, or *slide*, moves each point of a figure the same distance in the same direction. The image is congruent to the original figure.

A **rotation** is a transformation that turns each point of a figure the same number of degrees around a common point.

Translations To move right a units, add a to the x -coordinate. To move left a units, subtract a from the x -coordinate. To move up b units, add b to the y -coordinate. To move down b units, subtract b from the y -coordinate.

90° Clockwise Rotation For a point, switch the coordinates, then multiply the new y -coordinate by -1 .

90° Counterclockwise Rotation For a point, switch the coordinates, then multiply the new x -coordinate by -1 .

180° Rotation For a point, multiply its coordinates by -1 .

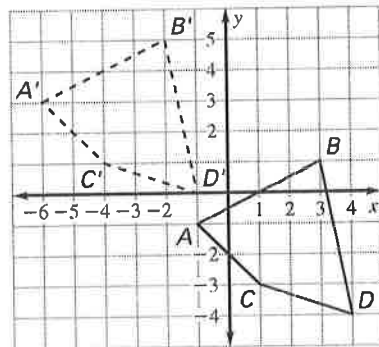
EXAMPLE 1 Using Coordinate Notation

Describe the translation from the solid figure to the dashed figure.

Solution

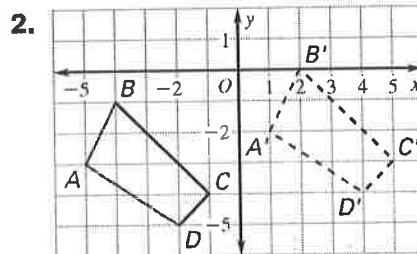
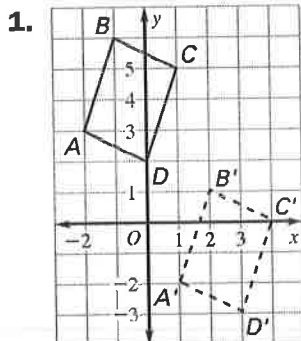
Each point moves 5 units to the left and 4 units up.

The translation is $(x, y) \rightarrow (x - 5, y + 4)$.



Exercises for Example 1

Describe the translation from the solid figure to the dashed figure.



Study Guide

For use with pages 409-413

EXAMPLE 2 Rotating 90° Counterclockwise

Rotate quadrilateral $KLMN$ 90° counterclockwise and graph its image.

Solution

Original **Image**

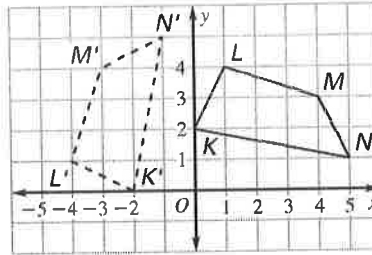
$$(x, y) \rightarrow (-y, x)$$

$$K(0, 2) \rightarrow K'(-2, 0)$$

$$L(1, 4) \rightarrow L'(-4, 1)$$

$$M(4, 3) \rightarrow M'(-3, 4)$$

$$N(5, 1) \rightarrow N'(-1, 5)$$



The graph shows $KLMN$ and $K'L'M'N'$.

Exercises for Example 2

Graph the figure and its image after the rotation.

- $K(-4, 3)$, $L(-2, 5)$, $M(0, 2)$, $N(-1, 1)$; 90° clockwise
- $A(-2, 5)$, $B(-4, -1)$, $C(-3, -2)$, $D(-1, 3)$; 90° counterclockwise

EXAMPLE 3 Rotating 180°

Rotate $\triangle ABC$ 180° and graph its image.

Solution

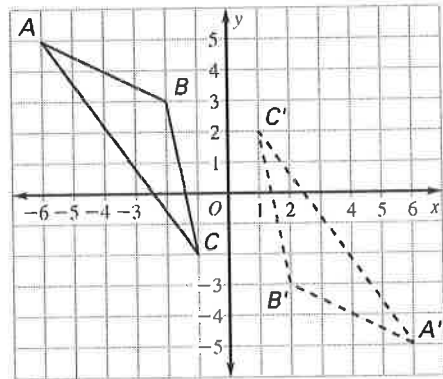
Original **Image**

$$(x, y) \rightarrow (-x, -y)$$

$$A(-6, 5) \rightarrow A'(6, -5)$$

$$B(-2, 3) \rightarrow B'(2, -3)$$

$$C(-1, -2) \rightarrow C'(1, 2)$$



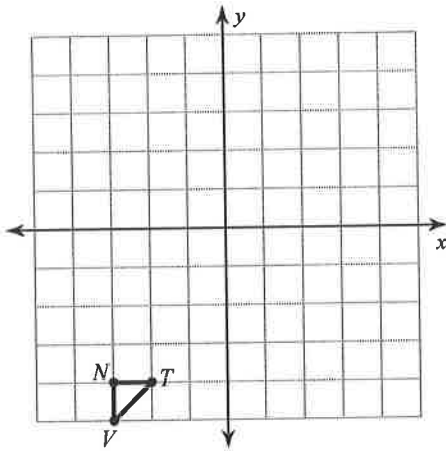
Exercise for Example 3

- Rotate $\triangle ABC$ 180° and graph its image.
 $A(4, 1)$, $B(6, -2)$, $C(1, -5)$

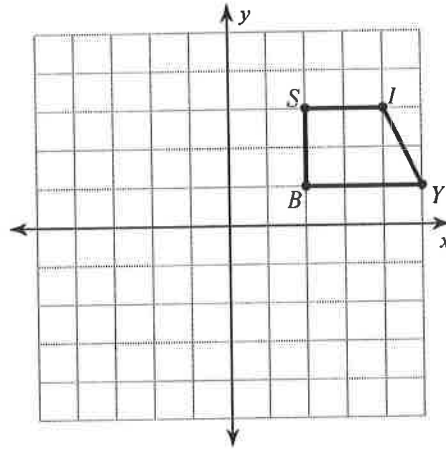
Blizzard Bag #1 Transformations

Graph the image of the figure using the transformation given.

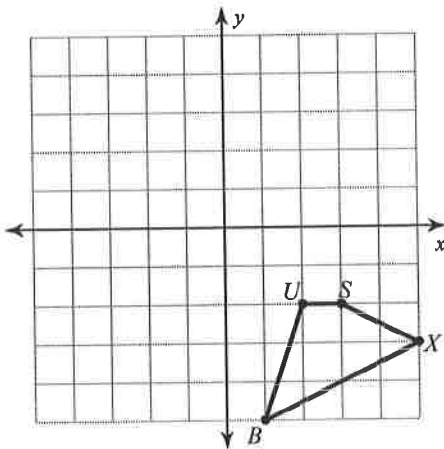
1) translation: $(x, y) \rightarrow (x + 1, y + 1)$



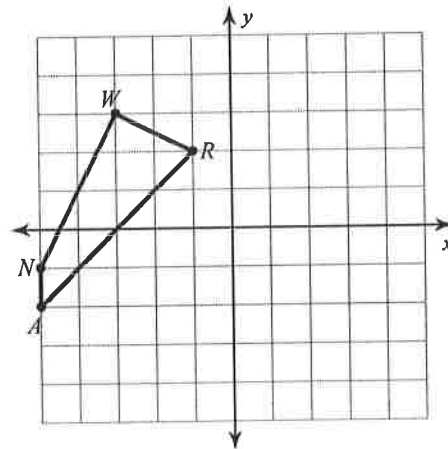
2) translation: $(x, y) \rightarrow (x - 1, y - 6)$



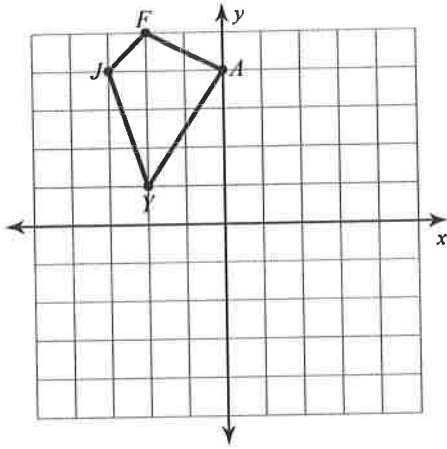
3) translation: $(x, y) \rightarrow (x - 6, y + 2)$



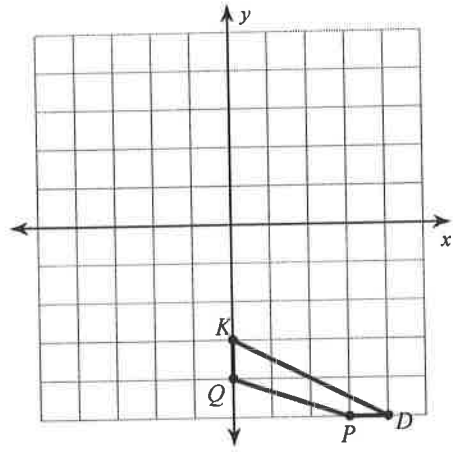
4) reflection across the x-axis



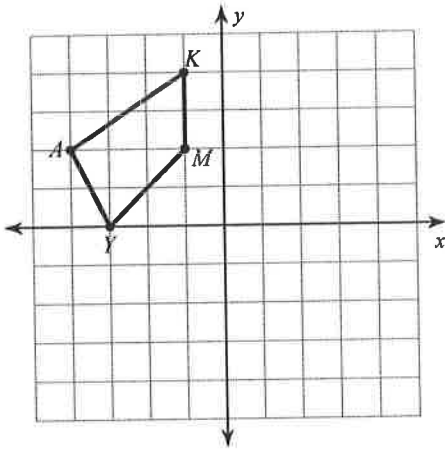
5) reflection across the y-axis



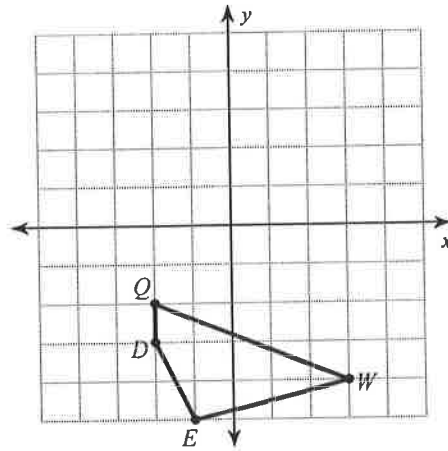
6) reflection across the y-axis



7) rotation 90° clockwise about the origin



8) rotation 90° counterclockwise about the origin



9) rotation 90° counterclockwise about the origin

