LESSON MAKER PRO

Polygon Move Lab

Track coordinates through translations and reflections.

GRADE 8 · 8.MG.3

8.MG.3 "The student will apply translations and reflections to polygons in the coordinate plane. Given a preimage in the coordinate plane, identify the coordinates of the image of a polygon that has been translated vertically, horizontally..."

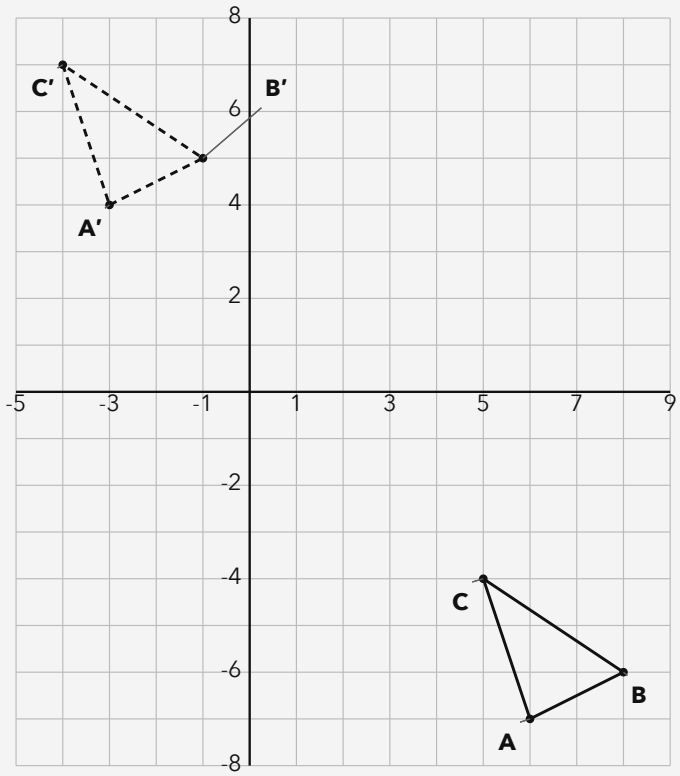
NAME _____ DATE _____

COORDINATE MOVES

For a translation, add the horizontal move to each x-coordinate and the vertical move to each y-coordinate. A reflection over the x-axis changes the sign of y. A reflection over the y-axis changes the sign of x.

WORKED EXAMPLE

Triangle ABC in the figure has A(6, -7), B(8, -6), and C(5, -4). Translate it 9 units left and 11 units up.



1. Move left 9, so subtract 9 from each x-coordinate.
2. Move up 11, so add 11 to each y-coordinate.
3. A' = (-3, 4), B' = (-1, 5), C' = (-4, 7).
4. The dashed triangle is the image; all three vertices use the same translation.

Answer: A' = (-3, 4), B' = (-1, 5), C' = (-4, 7)

PRACTICE 4 problems

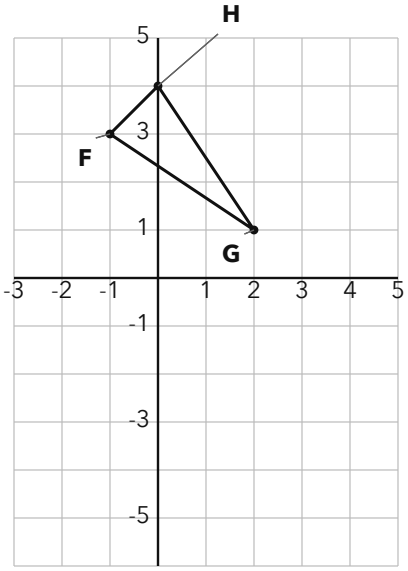
1 Point D is at (3, -2). Translate D 4 units left and 5 units up. What are the coordinates of D'?

ANSWER _____

2 Point E is at (-5, 4). Reflect E over the y-axis. What are the coordinates of E'?

ANSWER _____

3 Triangle FGH in the figure has F(-1, 3), G(2, 1), and H(0, 4). Reflect it over the x-axis, then translate it 2 units right and 1 unit down. Give all image coordinates. Sketch and label the final image on the grid.



ANSWER _____

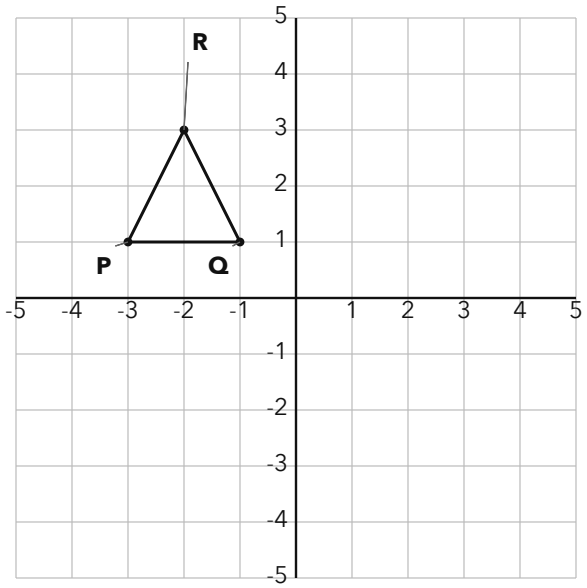
_____

4 Point J is at (4, -3). Reflect J over the y-axis, then translate it 3 units left and 2 units up. What are the coordinates of J'?

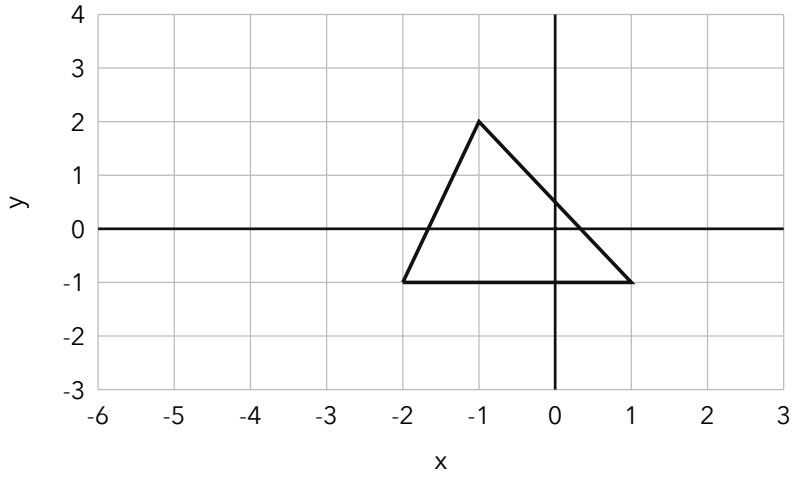
ANSWER _____

APPLY IT Show your work

1 A game designer plots a spaceship triangle PQR on the grid. Reflect the ship over the x-axis, then move it 1 unit right and 2 units up. Give the image coordinates. Sketch and label the final triangle.



2 A mural tile has vertices A(-2, -1), B(1, -1), and C(-1, 2). The artist moves the tile 4 units right, then reflects it over the y-axis. Give the final coordinates. Sketch and label the final triangle on the supplied plane.



CHALLENGE One step up

Point K is at (-2, 4). Find K' after reflecting over the x-axis and then translating 5 units right and 3 units down. Then find K'' after doing the translation first and reflecting over the x-axis second. Explain why the results differ.

ANSWER KEY

Polygon Move Lab

GRADE 8 · 8.MG.3

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Point D is at (3, -2). Translate D 4 units left and 5 units up. What are the coordinates of D'?	**(-1, 3)**
2	Point E is at (-5, 4). Reflect E over the y-axis. What are the coordinates of E'?	**(5, 4)**
3	Triangle FGH in the figure has F(-1, 3), G(2, 1), and H(0, 4). Reflect it over the x-axis, then translate it 2 units right and 1 unit down. Give all image coordinates. Sketch and label the final image on the grid.	**F' = (1, -4), G' = (4, -2), H' = (2, -5)**
4	Point J is at (4, -3). Reflect J over the y-axis, then translate it 3 units left and 2 units up. What are the coordinates of J'?	**(-7, -1)**

PART 2 · APPLY IT

1. **P' = (-2, 1), Q' = (0, 1), R' = (-1, -1)** Reflect each point by changing the sign of y. Then add 1 to x and 2 to y.
2. **A' = (-2, -1), B' = (-5, -1), C' = (-3, 2)** First add 4 to every x-coordinate. Then change the sign of each new x-coordinate for the y-axis reflection.

CHALLENGE

Reflect, then translate: K' = (3, -7). Translate, then reflect: K'' = (3, -1). The order differs because reflecting after the translation changes the sign of the translated y-coordinate.

Accept ordered pairs with or without prime marks when the correct image is clear. For the challenge, accept an equivalent explanation that the vertical translation is affected differently when the reflection happens second. Require actual polygon sketches in addition to coordinates; image vertices must be joined in corresponding order. The expanded planes include all preimage and final-image points.