

Coordinate Flip Shift

Move and mirror polygons on the coordinate plane.

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 _____

TRACK EVERY VERTEX

For a translation, add the horizontal change to each x-coordinate and the vertical change to each y-coordinate. A reflection over the x-axis changes the sign of y, and a reflection over the y-axis changes the sign of x. When two transformations are named, complete them in the stated order.

WORKED EXAMPLE

Triangle JKL has vertices J(30, -31), K(34, -28), and L(27, -25).
Translate the triangle left 12 units and up 15 units.

1. Left 12 means subtract 12 from every x-coordinate.
2. Up 15 means add 15 to every y-coordinate.
3. J: (30, -31) becomes (18, -16). Apply the same changes to K and L.

Answer: J'(18, -16), K'(22, -13), L'(15, -10)

PRACTICE 6 problems

- 1** Quadrilateral TUVW has vertices T(-4, 2), U(-1, 2), V(0, 5), and W(-3, 5). Translate it right 7 units and down 3 units.

ANSWER _____

- 2** Triangle ABC has vertices A(-5, 4), B(-2, 1), and C(-6, -1). Reflect it over the x-axis.

ANSWER _____

- 3** Parallelogram PQRS has vertices P(1, -5), Q(4, -5), R(6, -2), and S(3, -2). Reflect it over the y-axis.

ANSWER _____

- 4** Triangle DEF has vertices D(2, 3), E(5, 3), and F(3, 6). Translate it left 4 units, then reflect it over the y-axis.

ANSWER _____

- 5** Rectangle HIJK has vertices H(-3, 1), I(1, 1), J(1, 4), and K(-3, 4). Reflect it over the x-axis, then translate it right 2 units and up 4 units.

ANSWER _____

- 6** A design shape has vertices M(-2, -4), N(1, -4), and O(0, -1). Its image has vertices M'(5, 2), N'(2, 2), and O'(3, 5). Name the transformations in order.

ANSWER _____

APPLY IT Show your work

- 1** In a video game map, a triangular team badge has vertices $A(-7, 3)$, $B(-4, 3)$, and $C(-5, 6)$. The badge is reflected over the y -axis, then moved right 2 units and down 5 units. What are the image coordinates?

WORK SPACE

ANSWER _____

- 2** A hoodie designer makes a fabric tile with vertices $P(2, -3)$, $Q(5, -3)$, and $R(4, -1)$. The tile is moved left 4 units and up 2 units, then reflected over the x -axis. What are the image coordinates?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A robotics team starts with triangle RST , where $R(-3, 2)$, $S(-1, 4)$, and $T(-4, 5)$. Team 1 reflects the triangle over the y -axis, then translates it right 4 units and down 2 units. Team 2 translates the triangle right 4 units and down 2 units, then reflects it over the y -axis. Find both images and explain whether they are the same.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Quadrilateral TUVW has vertices T(-4, 2), U(-1, 2), V(0, 5), and W(-3, 5). Translate it right 7 units and down 3 units.	T'(3, -1), U'(6, -1), V'(7, 2), W'(4, 2)
2	Triangle ABC has vertices A(-5, 4), B(-2, 1), and C(-6, -1). Reflect it over the x-axis.	A'(-5, -4), B'(-2, -1), C'(-6, 1)
3	Parallelogram PQRS has vertices P(1, -5), Q(4, -5), R(6, -2), and S(3, -2). Reflect it over the y-axis.	P'(-1, -5), Q'(-4, -5), R'(-6, -2), S'(-3, -2)
4	Triangle DEF has vertices D(2, 3), E(5, 3), and F(3, 6). Translate it left 4 units, then reflect it over the y-axis.	D'(-2, 3), E'(-1, 3), F'(-1, 6)
5	Rectangle HIJK has vertices H(-3, 1), I(1, 1), J(1, 4), and K(-3, 4). Reflect it over the x-axis, then translate it right 2 units and up 4 units.	H'(-1, 3), I'(3, 3), J'(3, 0), K'(-1, 0)
6	A design shape has vertices M(-2, -4), N(1, -4), and O(0, -1). Its image has vertices M'(5, 2), N'(2, 2), and O'(3, 5). Name the transformations in order.	Reflect over the y-axis, then translate right 3 units and up 6 units.

PART 2 • APPLY IT

- A'(9, -2), B'(6, -2), C'(7, 1)** Reflect over the y-axis by changing each x-coordinate's sign. Then add 2 to each x-coordinate and subtract 5 from each y-coordinate.
- P'(-2, 1), Q'(1, 1), R'(0, -1)** First subtract 4 from each x-coordinate and add 2 to each y-coordinate. Then reflect over the x-axis by changing the sign of each y-coordinate.

CHALLENGE

Team 1: R'(7, 0), S'(5, 2), T'(8, 3). Team 2: R'(-1, 0), S'(-3, 2), T'(0, 3). The images are not the same because reflecting before translating gives different x-coordinates than translating before reflecting.

Accept coordinate pairs written with or without spaces after commas. Vertices must match their correct labels, and transformation order matters for combined transformations.