

Coordinate Moves

Track how figures change on the coordinate plane.

GRADE 8 • 8.G.A.3

CCSS.Math.Content.8.G.A.3 "Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates."

NAME _____

DATE _____

TRANSFORMATION RULES

A translation moves every point by the same horizontal and vertical amounts. A reflection flips points across a line, and a 90-degree rotation about the origin follows a coordinate rule such as (x, y) to $(-y, x)$ for counterclockwise. A dilation centered at the origin multiplies both coordinates by the scale factor.

WORKED EXAMPLE

Point N(12, -11) is translated 5 units right and 7 units down. Find N'.

1. Right 5 changes the x-coordinate: $12 + 5 = 17$.
2. Down 7 changes the y-coordinate: $-11 - 7 = -18$.
3. Write the image point: N'(17, -18).

Answer: N'(17, -18)

PRACTICE 6 problems

- 1** Triangle ABC has A(-3, 4), B(2, 4), and C(2, 9). Translate the triangle 6 units right and 3 units down. Give the coordinates of A', B', and C'.

ANSWER _____

- 2** Point D(-6, 3) is rotated 90 degrees counterclockwise about the origin. Find D'.

ANSWER _____

- 3** Point E(6, -2) is reflected across the y-axis. Find E'.

ANSWER _____

- 4** Point F(-4, -1) is reflected across the x-axis. Find F'.

ANSWER _____

- 5** Point G(8, -4) is dilated from the origin by a scale factor of $\frac{1}{2}$. Find G'.

ANSWER _____

- 6** Triangle HIJ has H(1, -3), I(4, -3), and J(1, 1). Dilate the triangle from the origin by a scale factor of 2. Give the image coordinates.

ANSWER _____

APPLY IT Show your work

- 1** A video game designer places a power-up icon with vertices $P(-4, 8)$, $Q(0, 8)$, and $R(0, 10)$. The icon moves 3 units right and 6 units down. What are the new coordinates of the icon?

WORK SPACE

ANSWER _____

- 2** A student designs a mural that is symmetric across the y -axis. One side has points $S(2, 3)$, $T(8, 3)$, and $U(6, 9)$. What points form the reflected side?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Triangle KLM has $K(-2, 4)$, $L(2, 4)$, and $M(2, 0)$. First rotate the triangle 90 degrees clockwise about the origin. Then dilate the image from the origin by a scale factor of $\frac{3}{2}$. Give the final coordinates and state whether the two transformations preserve or reverse orientation. Explain your reasoning.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Triangle ABC has A(-3, 4), B(2, 4), and C(2, 9). Translate the triangle 6 units right and 3 units down. Give the coordinates of A', B', and C'.	A'(3, 1), B'(8, 1), C'(8, 6)
2	Point D(-6, 3) is rotated 90 degrees counterclockwise about the origin. Find D'.	D'(-3, -6)
3	Point E(6, -2) is reflected across the y-axis. Find E'.	E'(-6, -2)
4	Point F(-4, -1) is reflected across the x-axis. Find F'.	F'(-4, 1)
5	Point G(8, -4) is dilated from the origin by a scale factor of $\frac{1}{2}$. Find G'.	G'(4, -2)
6	Triangle HIJ has H(1, -3), I(4, -3), and J(1, 1). Dilate the triangle from the origin by a scale factor of 2. Give the image coordinates.	H'(2, -6), I'(8, -6), J'(2, 2)

PART 2 • APPLY IT

- P'(-1, 2), Q'(3, 2), R'(3, 4)** Add 3 to each x-coordinate and subtract 6 from each y-coordinate. Apply the same translation to all three vertices.
- S'(-2, 3), T'(-8, 3), U'(-6, 9)** For a reflection across the y-axis, change each x-coordinate to its opposite. Keep each y-coordinate the same.

CHALLENGE

K''(6, 3), L''(6, -3), M''(0, -3). The transformations preserve orientation because a rotation and a positive dilation both preserve orientation.

Accept coordinates written in any clear ordered-pair format and in any vertex order when the matching labels are clear. For the challenge, accept an equivalent explanation that rotation and a positive scale-factor dilation preserve orientation.