

Transformations

Answer key

HSG.CO.A.2

HSG.CO.A.5

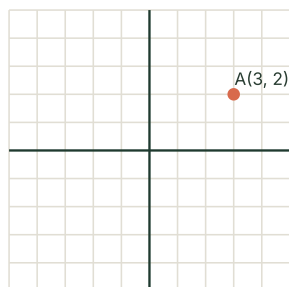
15 problems

- The point $(2, 5)$ is translated 3 units right and 4 units down. Give the coordinates of the image.

Answer $(5, 1)$

Add to x , subtract from y : $(2 + 3, 5 - 4) = (5, 1)$.

- Point $A(3, 2)$ is reflected over the x -axis. Give the coordinates of the image A' .



Answer $A'(3, -2)$

Reflection over the x -axis keeps x and negates y : $(3, -2)$.

- Point $B(-2, 4)$ is reflected over the y -axis. Give the coordinates of the image B' .

Answer $B'(2, 4)$

Reflection over the y -axis negates x and keeps y : $(2, 4)$.

- Point $C(4, 1)$ is reflected over the line $y = x$. Give the coordinates of the image C' .

Answer $C'(1, 4)$

Reflection over $y = x$ swaps the coordinates: $(1, 4)$.

- Point $D(2, 3)$ is rotated 90° counterclockwise about the origin. Give the coordinates of the image D' .

Answer $D'(-3, 2)$

Use $(x, y) \rightarrow (-y, x)$: $(-3, 2)$.

- Point $E(-3, 1)$ is rotated 180° about the origin. Give the coordinates of the image E' .

Answer $E'(3, -1)$

Use $(x, y) \rightarrow (-x, -y)$: $(3, -1)$.

- Point $F(5, 2)$ is rotated 90° clockwise about the origin. Give the coordinates of the image F' .

Answer $F'(2, -5)$

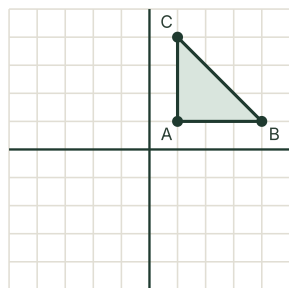
A 90° clockwise rotation uses $(x, y) \rightarrow (y, -x)$: $(2, -5)$.

- Point $G(2, -3)$ is dilated from the origin by a scale factor of 2. Give the coordinates of the image G' .

Answer $G'(4, -6)$

Multiply each coordinate by 2: $(2 \cdot 2, -3 \cdot 2) = (4, -6)$.

9. Triangle ABC with $A(1, 1)$, $B(4, 1)$, $C(1, 4)$ is reflected over the x -axis. Give the coordinates of A' , B' , and C' .



Answer $A'(1, -1)$, $B'(4, -1)$, $C'(1, -4)$

Negate each y -coordinate: $A'(1, -1)$, $B'(4, -1)$, $C'(1, -4)$.

10. A figure is moved so that point $P(3, 4)$ maps to $P'(-3, 4)$ and every other point follows the same rule. Name the single transformation.

Answer Reflection over the y -axis

The y -coordinate is unchanged and the x -coordinate is negated, which is a reflection over the y -axis.

11. Triangle with vertices $(1, 2)$, $(2, 1)$, and $(1, -1)$ is dilated from the origin by a scale factor of 3. Give the coordinates of the three image vertices.

Answer $(3, 6)$, $(6, 3)$, $(3, -3)$

Multiply each coordinate by 3: $(3, 6)$, $(6, 3)$, $(3, -3)$.

12. Which transformation does **not** always produce an image congruent to the original figure?

Answer D) Dilation with scale factor 2

Translations, reflections, and rotations are rigid motions that preserve size and shape. A dilation with scale factor 2 changes the size, so the image is similar but not congruent.

13. A transformation sends every point (x, y) to $(-y, x)$. Triangle JKL has vertices $J(1, 0)$, $K(4, 0)$, $L(4, 3)$. Name the transformation and give L' .

Answer 90° counterclockwise rotation about the origin; $L'(-3, 4)$

$(x, y) \rightarrow (-y, x)$ is a 90° CCW rotation about the origin. For $L(4, 3)$: $(-3, 4)$.

14. Point $Q(-2, 3)$ is first reflected over the y -axis, then the result is translated 5 units down. Give the coordinates of the final image.

Answer $(2, -2)$

Reflect over the y -axis: $(-2, 3) \rightarrow (2, 3)$. Translate 5 down: $(2, 3 - 5) = (2, -2)$.

15. Quadrilateral with vertices $(4, 6)$, $(2, -4)$, $(-6, 2)$, and $(0, 8)$ is dilated from the origin by a scale factor of $\frac{1}{2}$. Give the coordinates of the four image vertices.

Answer $(2, 3)$, $(1, -2)$, $(-3, 1)$, $(0, 4)$

Multiply each coordinate by $\frac{1}{2}$: $(2, 3)$, $(1, -2)$, $(-3, 1)$, $(0, 4)$.