ALBERT

Name _____ Date _____

Transformations on the Coordinate Plane Worksheet

Grade 8 · Common Core 8.G.A.3

> Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.

Practice

Builds the skill step by step.

1. The point (2, 5) is translated 3 units left and 4 units down. What are the coordinates of its image?

2. The point (4, −3) is reflected across the x-axis. What are the coordinates of its image?

3. The point (−5, 2) is reflected across the y-axis. What are the coordinates of its image?

4. The point (3, 6) is dilated by a scale factor of 2 with the center at the origin. What are the coordinates of its image?

5. The point (2, 7) is rotated 180° about the origin. What are the coordinates of its image?

6. Which rule describes a reflection across the y-axis?

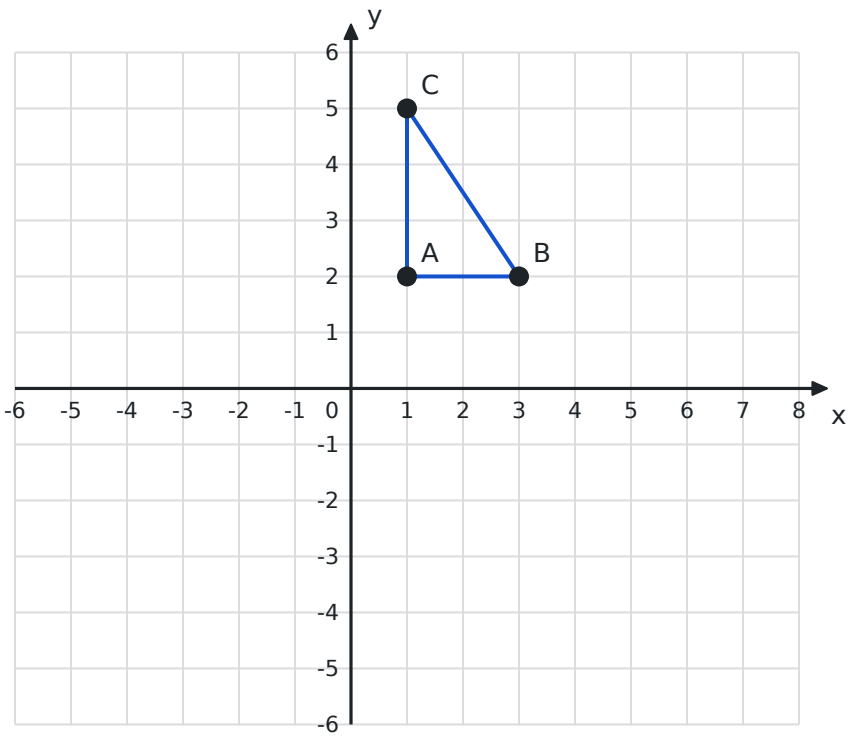
   A. (x, y) → (−x, y)

   B. (x, y) → (x, −y)

   C. (x, y) → (−x, −y)

   D. (x, y) → (y, x)

7. Triangle ABC is translated using the rule $(x, y) \rightarrow (x + 4, y - 1)$. Where does B go?



8. The point $(8, -4)$ is dilated by a scale factor of $\frac{1}{2}$ with the center at the origin. What are the coordinates of its image?

9. Which rule describes a rotation of 90° counterclockwise about the origin?

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

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

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

   D. $(x, y) \rightarrow (y, x)$

10. The point (5, 1) is rotated 90° counterclockwise about the origin. What are the coordinates of its image?

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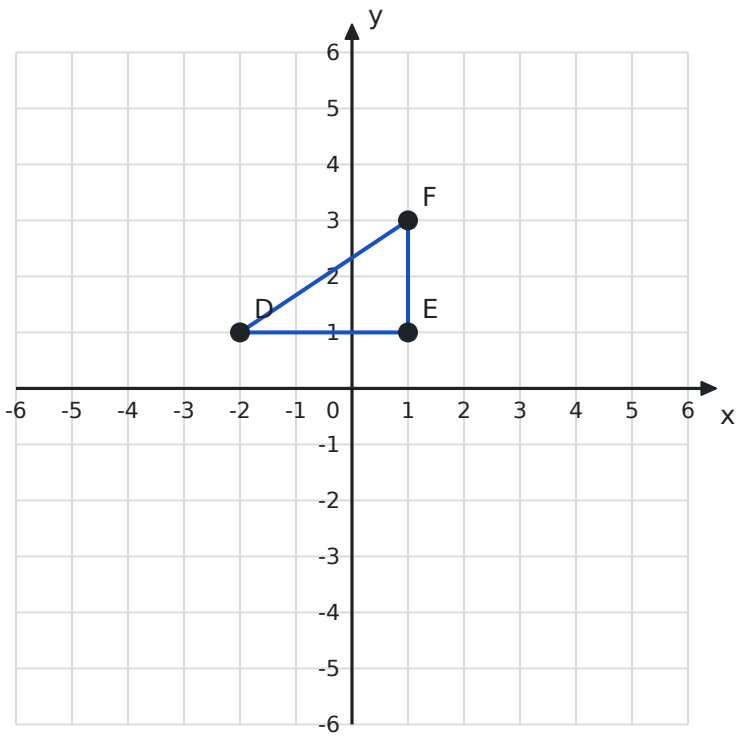
On Level

Grade-level practice.

1. Triangle DEF is reflected across the x-axis. What are the coordinates of the image of F?



2. The point (3, −2) is rotated 90° clockwise about the origin. What are the coordinates of its image?

3. A square has vertices (1, 1), (3, 1), (3, 3) and (1, 3). It is dilated by a scale factor of 3 with the center at the origin. What is the area of the image?

4. Which rule describes a translation 5 units right and 2 units down?

   A. $(x, y) \to (x + 5, y - 2)$

   B. $(x, y) \to (x - 5, y + 2)$

   C. $(x, y) \to (x + 2, y - 5)$

   D. $(x, y) \to (5x, -2y)$

5. The point $(-4, 6)$ is dilated by a scale factor of $\frac{1}{2}$ with the center at the origin, and then reflected across the x-axis. Where does it end up?

6. A point $A(2, 3)$ has the image $A'(-3, 2)$. Which transformation could it be?

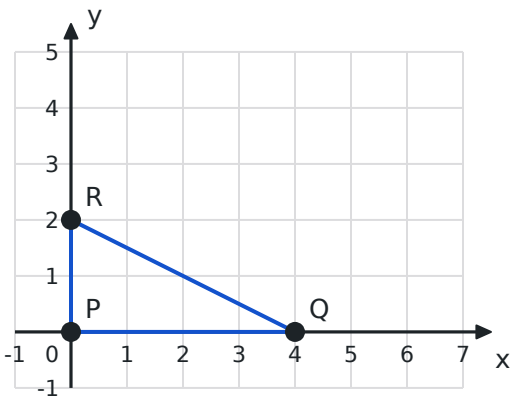
   A. A rotation of 90° clockwise about the origin

   B. A reflection across the y-axis

   C. A rotation of 180° about the origin

   D. A rotation of 90° counterclockwise about the origin

7. Triangle PQR is dilated by a scale factor of 1.5 with the center at the origin. What are the coordinates of Q′?



8. After which transformation is the image NOT congruent to the original figure?

   A. A rotation of 90° about the origin

   B. A translation 3 units up

   C. A reflection across the x-axis

   D. A dilation by a scale factor of 3

9. Apply the rule (x, y) → (x − 3, y + 5) to the point (−1, −4).

10. Describe the effect of the rule (x, y) → (−x, y) on a figure.

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Challenge

Multi-step and word problems that stretch it.

1. The point $(3, -1)$ is rotated 90° counterclockwise about the origin and then translated 2 units up. Where does it end up?

2. A dilation with the center at the origin maps $(6, 9)$ to $(4, 6)$. What is the scale factor?

3. Jo rotated the point $(2, 5)$ by 90° counterclockwise about the origin and wrote $(5, -2)$. What is the error?

   A. There is no error.

   B. Jo should have changed both signs; the image should be $(-2, -5)$.

   C. Jo used the clockwise rule; the image should be $(-5, 2)$.

   D. Jo reflected across the x-axis; the image should be $(2, -5)$.

4. A translation maps $(-3, 4)$ to $(2, -1)$. Where does the same translation map $(0, 0)$?

5. A segment has endpoints $(-2, 1)$ and $(4, 1)$. It is dilated by a scale factor of 2.5 with the center at the origin. How long is the image?

6. The point $(3, 4)$ is reflected across the line $y = x$. What are the coordinates of its image?

7. A rectangle has vertices (0, 0), (5, 0), (5, 2) and (0, 2). It is dilated by a scale factor of 3 with the center at the origin. What is the perimeter of the image?

8. The point $(-2, 5)$ is reflected across the y-axis and then rotated 180° about the origin. Where does it end up?

9. A figure is moved by $(x, y) \to (2x, 2y)$ and then by $(x, y) \to (x - 1, y + 3)$. Which describes the two steps?

   A. A translation 2 units right, then a dilation by 3

   B. A dilation by a scale factor of 2, then a translation 1 unit left and 3 units up

   C. A dilation by a scale factor of 2, then a translation 1 unit right and 3 units down

   D. A reflection, then a translation 1 unit left and 3 units up

10. Compare what the rules $(x, y) \to (3x, 3y)$ and $(x, y) \to (x + 3, y + 3)$ do to a triangle.