

Translations (Part 1) — ANSWER KEY

Slide every vertex the same direction and distance. Draw the image and label it with prime marks (A' , B' , ...).

1. Translate the figure 4 units left and 3 units up.

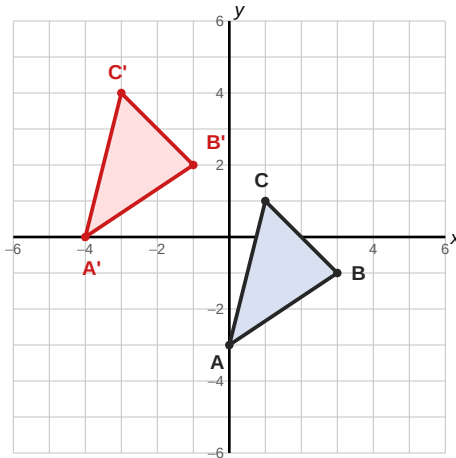


Image coordinates:

$A' (-4, 0)$

$B' (-1, 2)$

$C' (-3, 4)$

Original:

$A (0, -3)$

$B (3, -1)$

$C (1, 1)$

2. Translate using the rule $(x, y) \rightarrow (x, y + 6)$.

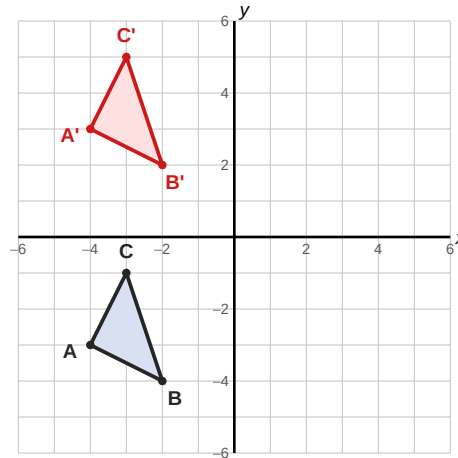


Image coordinates:

$A' (-4, 3)$

$B' (-2, 2)$

$C' (-3, 5)$

Original:

$A (-4, -3)$

$B (-2, -4)$

$C (-3, -1)$

3. Translate the figure 6 units right and 6 units up.

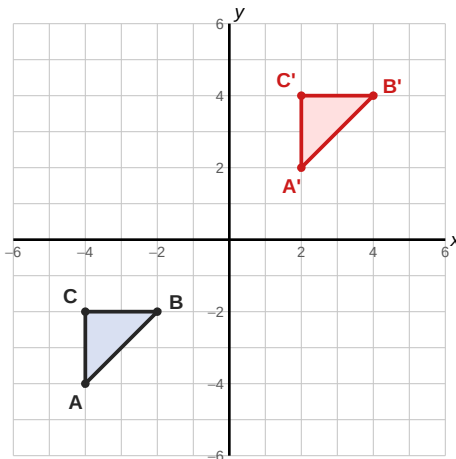


Image coordinates:

$A' (2, 2)$

$B' (4, 4)$

$C' (2, 4)$

Original:

$A (-4, -4)$

$B (-2, -2)$

$C (-4, -2)$

4. Translate using the rule $(x, y) \rightarrow (x - 3, y - 3)$.

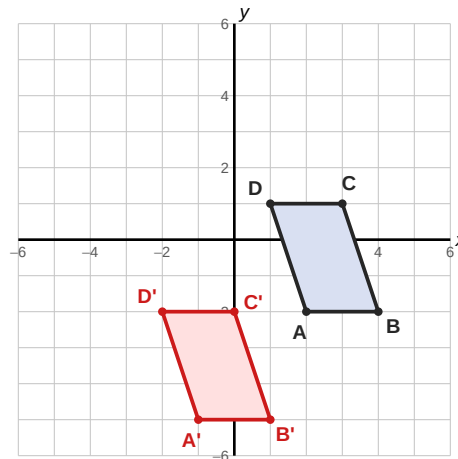


Image coordinates:

$A' (-1, -5)$

$B' (1, -5)$

$C' (0, -2)$

$D' (-2, -2)$

Original:

$A (2, -2)$

$B (4, -2)$

$C (3, 1)$

$D (1, 1)$

5. Translate the figure 4 units right and 3 units down.

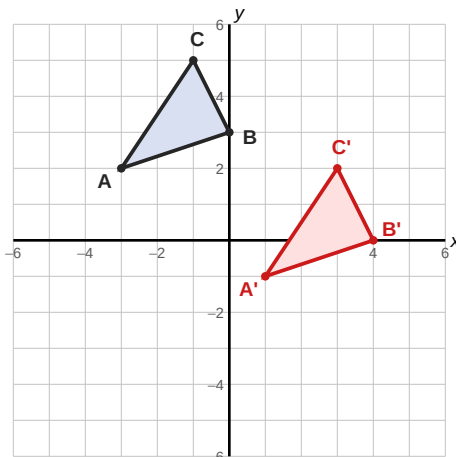


Image coordinates:

$A' (1, -1)$

$B' (4, 0)$

$C' (3, 2)$

Original:

$A (-3, 2)$

$B (0, 3)$

$C (-1, 5)$

6. Translate using the rule $(x, y) \rightarrow (x + 5, y + 1)$.

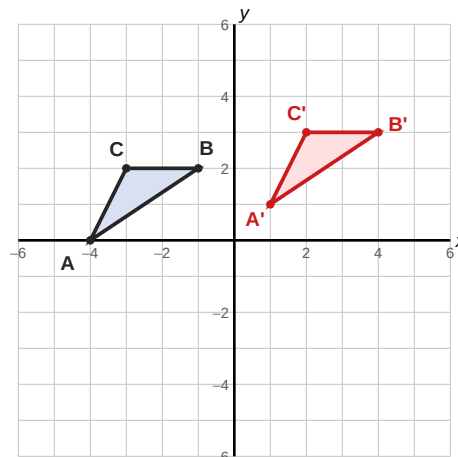


Image coordinates:

$A' (1, 1)$

$B' (4, 3)$

$C' (2, 3)$

Original:

$A (-4, 0)$

$B (-1, 2)$

$C (-3, 2)$

Translations (Part 2) — ANSWER KEY

Slide every vertex the same direction and distance. Draw the image and label it with prime marks (A' , B' , ...).

7. Translate the figure 5 units left and 2 units up.

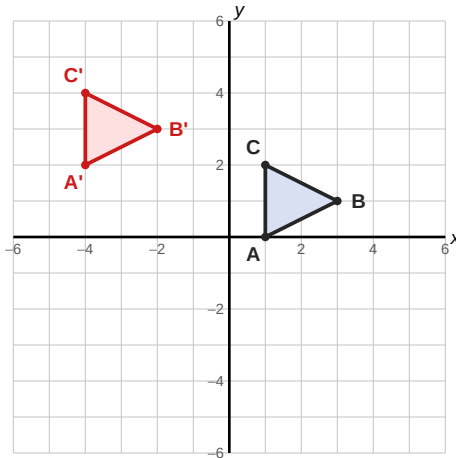


Image coordinates:

$A' (-4, 2)$

$B' (-2, 3)$

$C' (-4, 4)$

Original:

$A (1, 0)$

$B (3, 1)$

$C (1, 2)$

8. Translate using the rule $(x, y) \rightarrow (x - 4, y + 2)$.

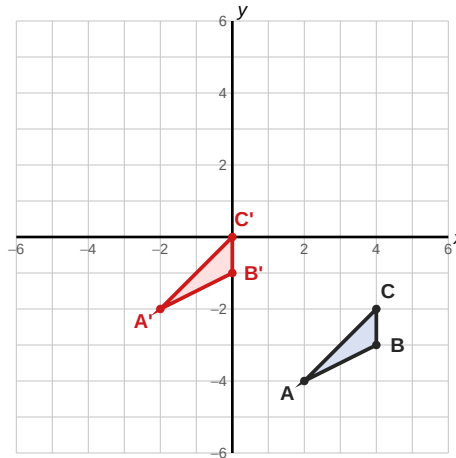


Image coordinates:

$A' (-2, -2)$

$B' (0, -1)$

$C' (0, 0)$

Original:

$A (2, -4)$

$B (4, -3)$

$C (4, -2)$

9. Translate the figure 3 units right and 4 units down.

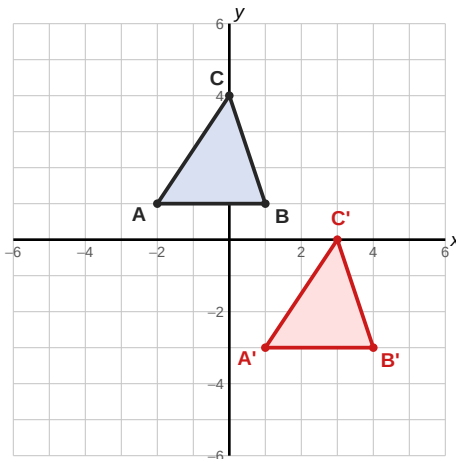


Image coordinates:

$A' (1, -3)$

$B' (4, -3)$

$C' (3, 0)$

Original:

$A (-2, 1)$

$B (1, 1)$

$C (0, 4)$

10. Translate using the rule $(x, y) \rightarrow (x - 3, y - 5)$.

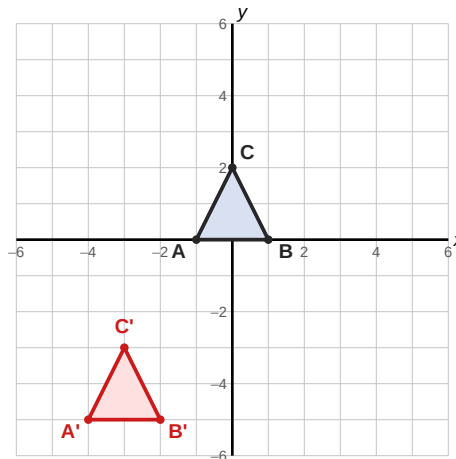


Image coordinates:

$A' (-4, -5)$

$B' (-2, -5)$

$C' (-3, -3)$

Original:

$A (-1, 0)$

$B (1, 0)$

$C (0, 2)$

11. Translate the figure 2 units right and 3 units down.

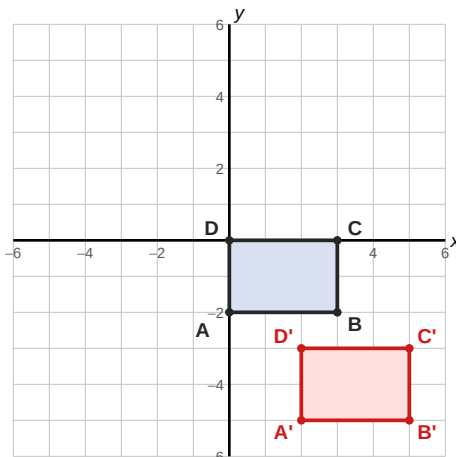


Image coordinates:

$A' (2, -5)$

$B' (5, -5)$

$C' (5, -3)$

$D' (2, -3)$

Original:

$A (0, -2)$

$B (3, -2)$

$C (3, 0)$

$D (0, 0)$

12. Translate using the rule $(x, y) \rightarrow (x + 2, y - 6)$.

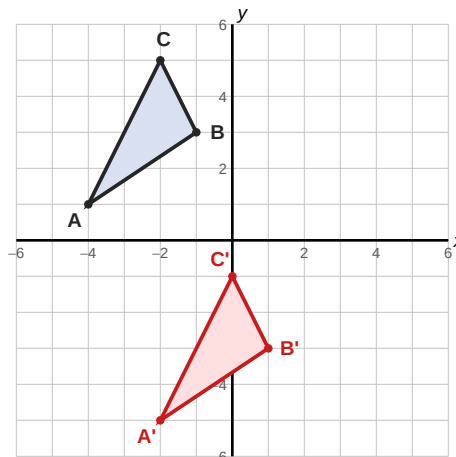


Image coordinates:

$A' (-2, -5)$

$B' (1, -3)$

$C' (0, -1)$

Original:

$A (-4, 1)$

$B (-1, 3)$

$C (-2, 5)$

Reflections (Part 1) — ANSWER KEY

Flip the figure over the given line. Each image point is the same distance from the line as the original.

1. Reflect the figure over the x-axis.

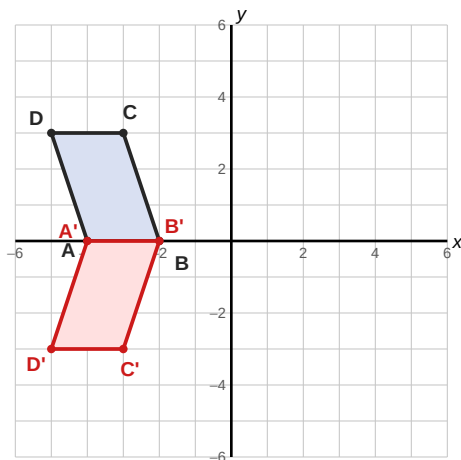


Image coordinates:

A' **$(-4, 0)$**

B' **$(-2, 0)$**

C' **$(-3, -3)$**

D' **$(-5, -3)$**

Original:

A $(-4, 0)$

B $(-2, 0)$

C $(-3, 3)$

D $(-5, 3)$

2. Reflect the figure over the y-axis.

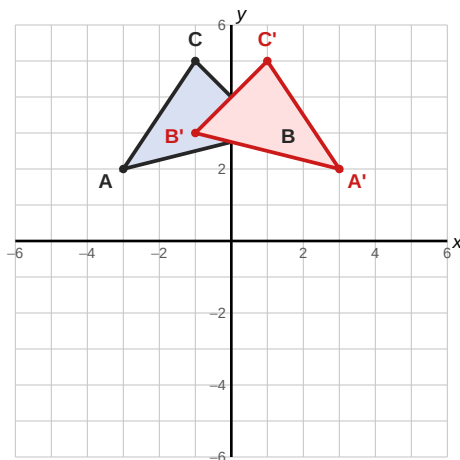


Image coordinates:

A' **$(3, 2)$**

B' **$(-1, 3)$**

C' **$(1, 5)$**

Original:

A $(-3, 2)$

B $(1, 3)$

C $(-1, 5)$

3. Reflect the figure over the line $y = x$.

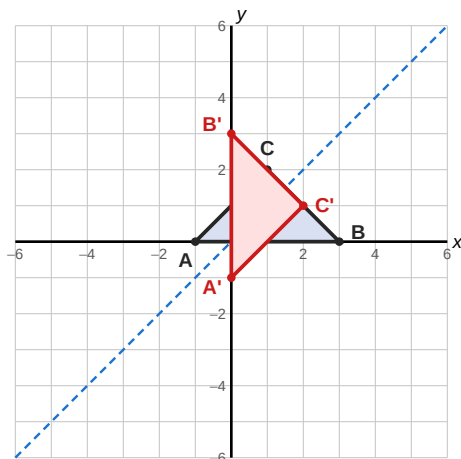


Image coordinates:

A' **$(0, -1)$**

B' **$(0, 3)$**

C' **$(2, 1)$**

Original:

A $(1, 0)$

B $(3, 0)$

C $(2, 2)$

4. Reflect the figure over the line $y = -x$.

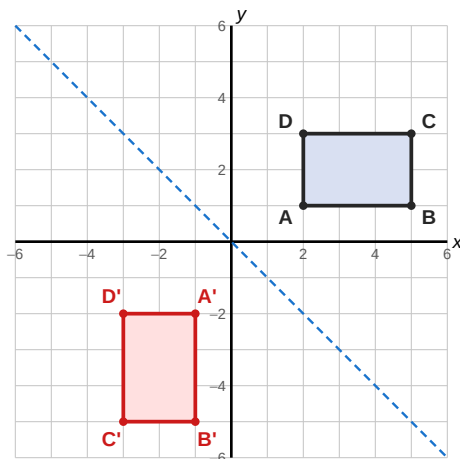


Image coordinates:

A' **$(-1, -2)$**

B' **$(-1, -5)$**

C' **$(-3, -5)$**

D' **$(-3, -2)$**

Original:

A $(2, 1)$

B $(5, 1)$

C $(5, 3)$

D $(2, 3)$

5. Reflect the figure over the x-axis.

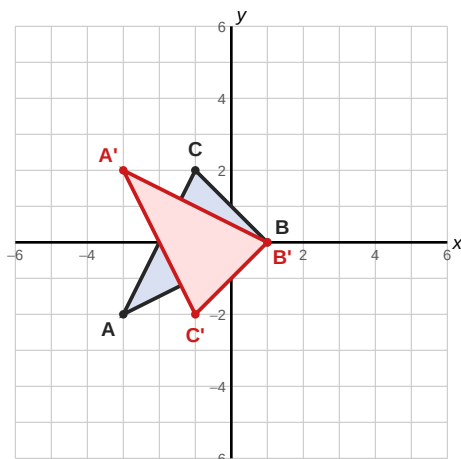


Image coordinates:

A' **$(-3, 2)$**

B' **$(1, 0)$**

C' **$(-1, -2)$**

Original:

A $(-3, -2)$

B $(1, 0)$

C $(-1, 2)$

6. Reflect the figure over the y-axis.

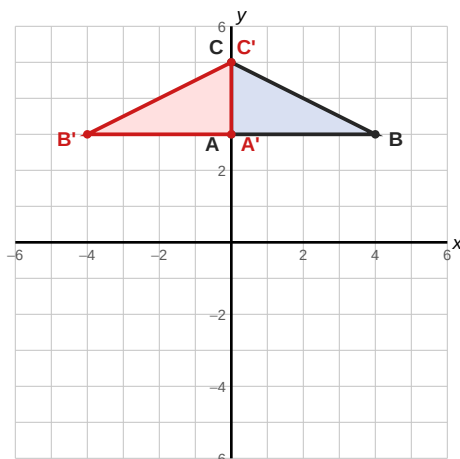


Image coordinates:

A' **$(0, 3)$**

B' **$(-4, 3)$**

C' **$(0, 5)$**

Original:

A $(0, 3)$

B $(4, 3)$

C $(0, 5)$

Reflections (Part 2) — ANSWER KEY

Flip the figure over the given line. Each image point is the same distance from the line as the original.

7. Reflect the figure over the line $y = x$.

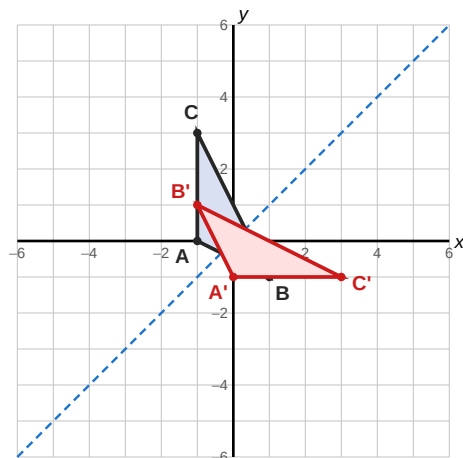


Image coordinates:

A' (0, -1)

B' (-1, 1)

C' (3, -1)

Original:

A (-1, 0)

B (1, -1)

C (-1, 3)

8. Reflect the figure over the line $y = -x$.

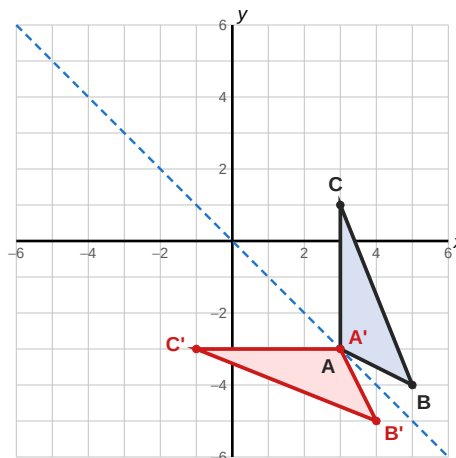


Image coordinates:

A' (3, -3)

B' (4, -5)

C' (-1, -3)

Original:

A (3, -3)

B (5, -4)

C (3, 1)

9. Reflect the figure over the line $x = -2$.

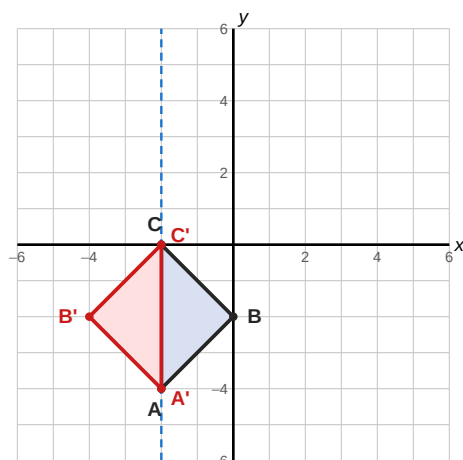


Image coordinates:

A' (-2, -4)

B' (-4, -2)

C' (-2, 0)

Original:

A (-2, -4)

B (0, -2)

C (-2, 0)

10. Reflect the figure over the line $y = -2$.

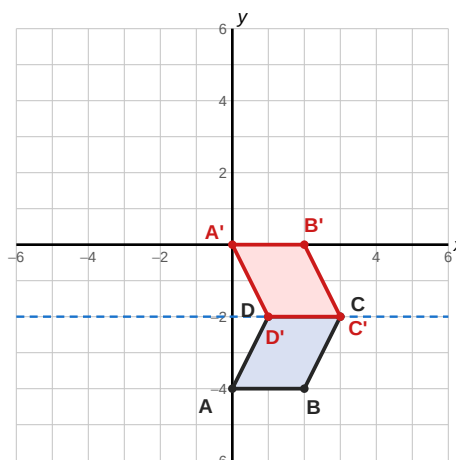


Image coordinates:

A' (0, 0)

B' (2, 0)

C' (3, -2)

D' (1, -2)

Original:

A (0, -4)

B (2, -4)

C (3, -2)

D (1, -2)

11. Reflect the figure over the line $x = -1$.

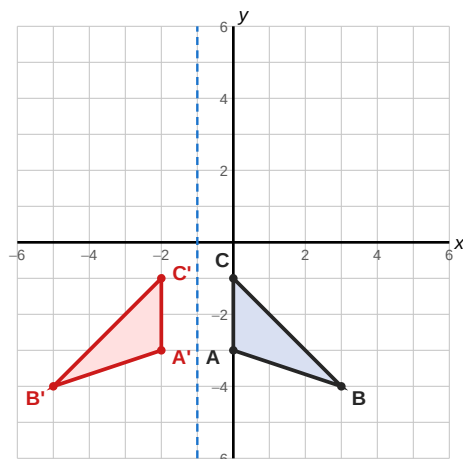


Image coordinates:

A' (-2, -3)

B' (-5, -4)

C' (-2, -1)

Original:

A (0, -3)

B (3, -4)

C (0, -1)

12. Reflect the figure over the line $y = 2$.

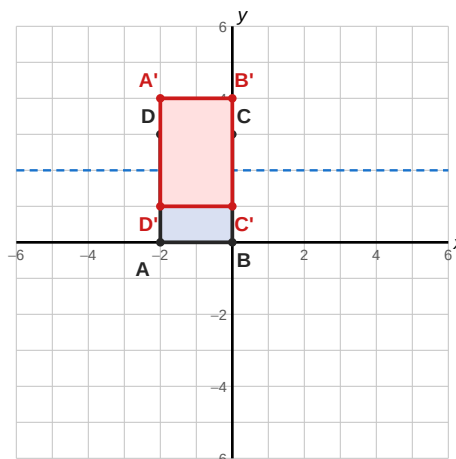


Image coordinates:

A' (-2, 4)

B' (0, 4)

C' (0, 1)

D' (-2, 1)

Original:

A (-2, 0)

B (0, 0)

C (0, 3)

D (-2, 3)

Rotations (Part 1) — ANSWER KEY

Turn the figure about the origin (0, 0). Tip: trace the figure, put your pencil on the origin, and turn the paper.

1. Rotate the figure 90° counterclockwise about the origin.

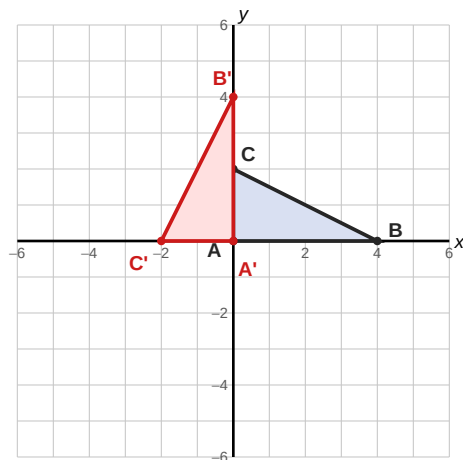


Image coordinates:

A' (0, 0)

B' (-2, 0)

C' (-2, 0)

Original:

A (0, 0)

B (4, 0)

C (0, 2)

2. Rotate the figure 90° clockwise about the origin.

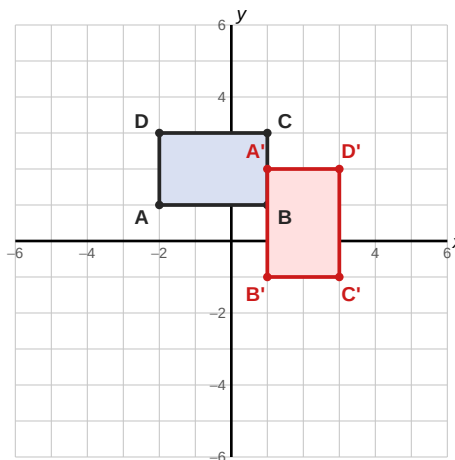


Image coordinates:

A' (1, 2)

B' (1, -1)

C' (3, -1)

D' (3, 2)

Original:

A (-2, 1)

B (1, 1)

C (1, 3)

D (-2, 3)

3. Rotate the figure 180° about the origin.

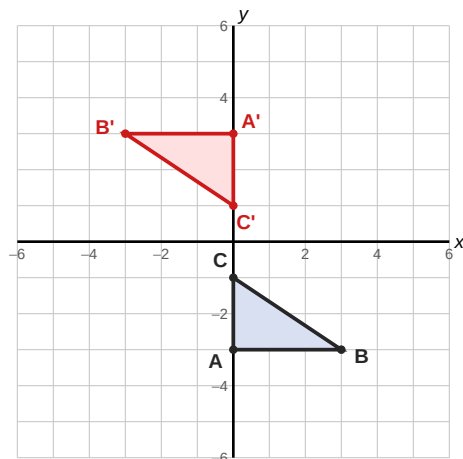


Image coordinates:

A' (0, 3)

B' (-3, 3)

C' (0, 1)

Original:

A (0, -3)

B (3, -3)

C (0, -1)

4. Rotate the figure 270° counterclockwise about the origin.

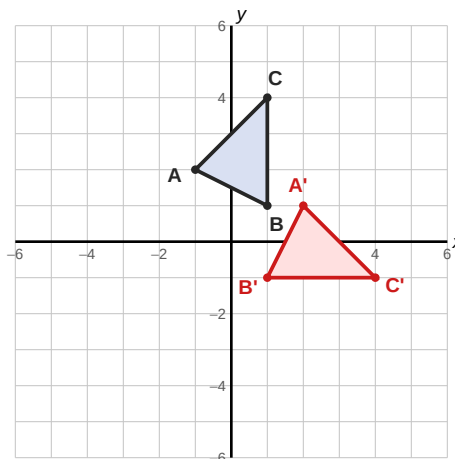


Image coordinates:

A' (2, 1)

B' (1, -1)

C' (4, -1)

Original:

A (-1, 2)

B (1, 1)

C (1, 4)

5. Rotate the figure 90° counterclockwise about the origin.

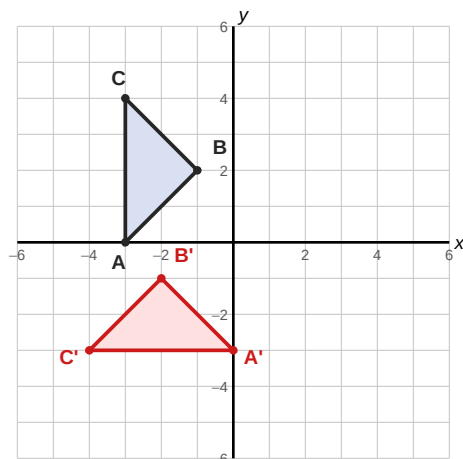


Image coordinates:

A' (0, -3)

B' (-2, -1)

C' (-4, -3)

Original:

A (-3, 0)

B (-1, 2)

C (-3, 4)

6. Rotate the figure 90° clockwise about the origin.

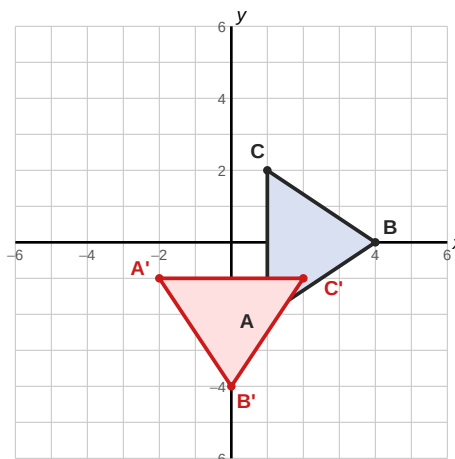


Image coordinates:

A' (-2, -1)

B' (0, -4)

C' (2, -1)

Original:

A (1, 2)

B (4, 0)

C (1, 2)

Rotations (Part 2) — ANSWER KEY

Turn the figure about the origin (0, 0). Tip: trace the figure, put your pencil on the origin, and turn the paper.

7. Rotate the figure 180° about the origin.

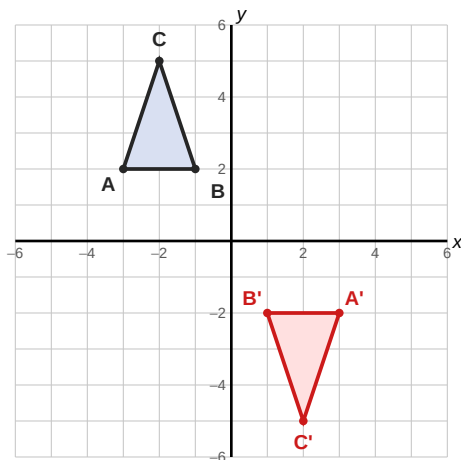


Image coordinates:

A' (3, -2)

B' (1, -2)

C' (2, -5)

Original:

A (-3, 2)

B (-1, 2)

C (-2, 5)

8. Rotate the figure 270° counterclockwise about the origin.

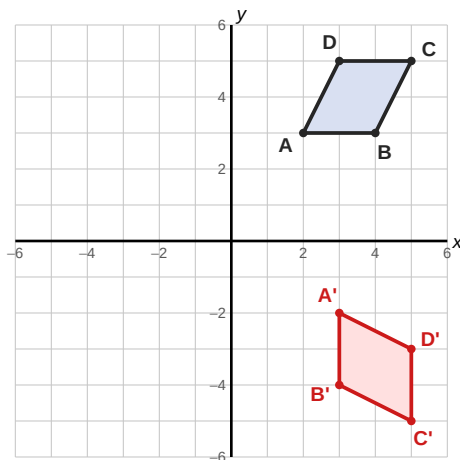


Image coordinates:

A' (3, -2)

B' (4, -3)

C' (5, -5)

D' (3, -5)

Original:

A (2, 3)

B (4, 3)

C (5, 5)

D (3, 5)

9. Rotate the figure 90° counterclockwise about the origin.

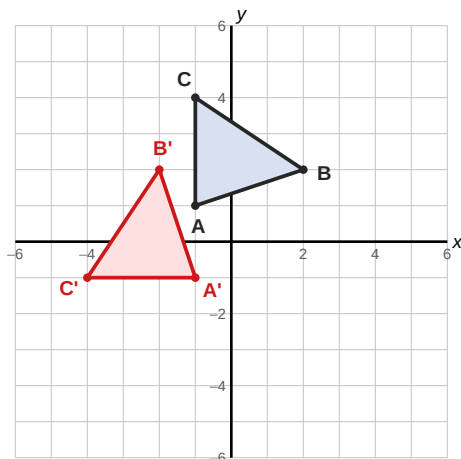


Image coordinates:

A' (-1, -1)

B' (-2, 2)

C' (-4, -1)

Original:

A (-1, 1)

B (2, 2)

C (-1, 4)

10. Rotate the figure 90° clockwise about the origin.

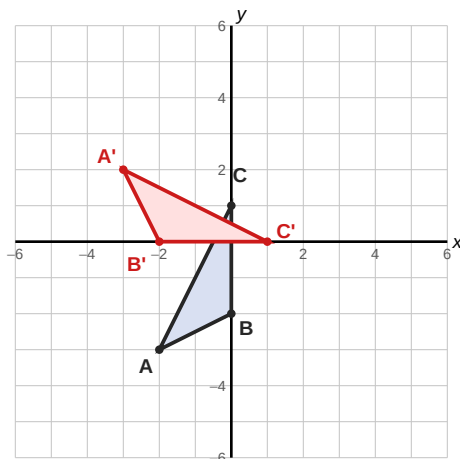


Image coordinates:

A' (-3, 2)

B' (-2, 0)

C' (1, 0)

Original:

A (-2, -3)

B (0, -2)

C (0, 1)

11. Rotate the figure 180° about the origin.

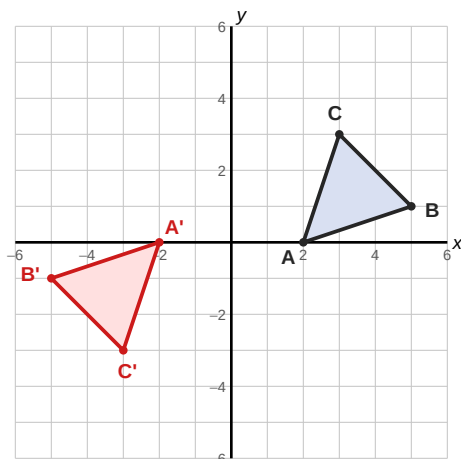


Image coordinates:

A' (-2, 0)

B' (-5, -1)

C' (-3, -3)

Original:

A (2, 0)

B (5, 1)

C (3, 3)

12. Rotate the figure 270° counterclockwise about the origin.

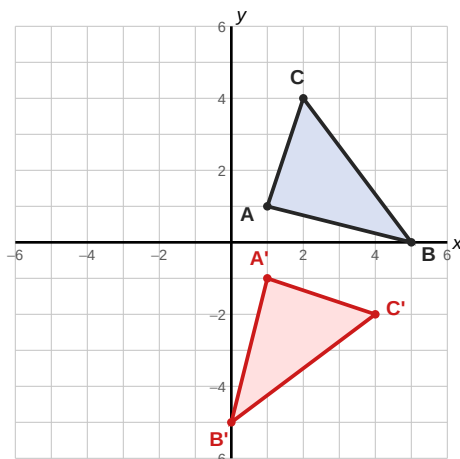


Image coordinates:

A' (1, -1)

B' (0, -5)

C' (4, -2)

Original:

A (1, 1)

B (5, 0)

C (2, 4)

Mixed Review (Two-Step) — ANSWER KEY

Do the first transformation, then apply the second one to that result. Graph only the final image.

1. Translate 2 units right and 2 units up, then reflect over the line $y = x$.

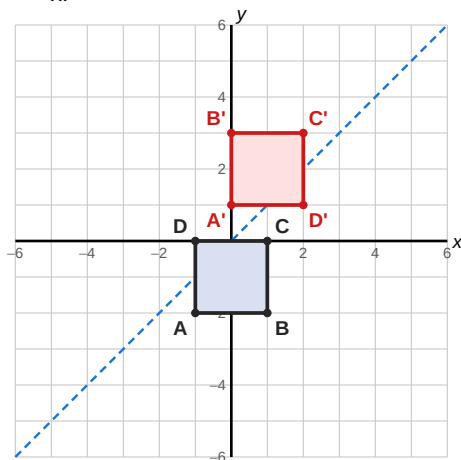


Image coordinates:

A' (0, 1)

B' (0, 3)

C' (2, 3)

D' (2, 1)

Original:

A (-1, -2)

B (1, -2)

C (1, 0)

D (-1, 0)

2. Reflect over the x-axis, then rotate 90° counterclockwise about the origin.

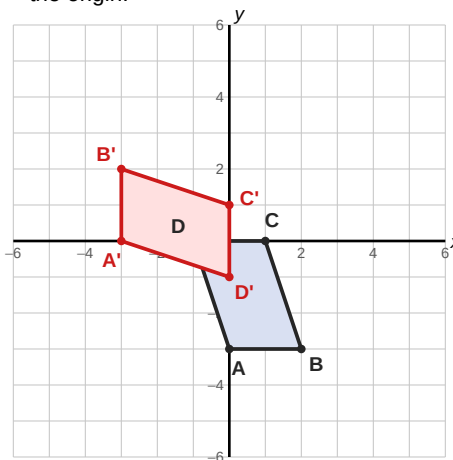


Image coordinates:

A' (-3, 0)

B' (-3, 2)

C' (0, 1)

D' (0, -1)

Original:

A (0, -3)

B (2, -3)

C (1, 0)

D (-1, 0)

3. Rotate 90° counterclockwise about the origin, then translate 1 unit right and 3 units down.

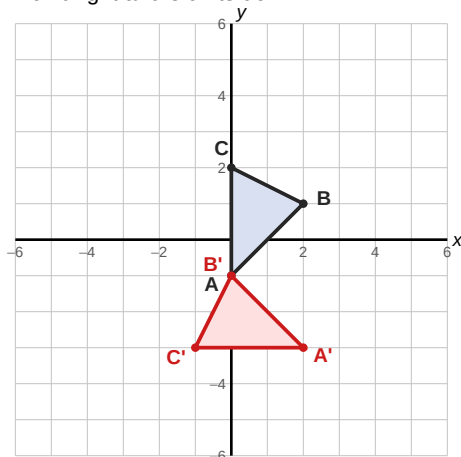


Image coordinates:

A' (2, -3)

B' (0, -1)

C' (-1, -3)

Original:

A (0, -1)

B (2, 1)

C (0, 2)

4. Translate 2 units right and 2 units up, then reflect over the y-axis.

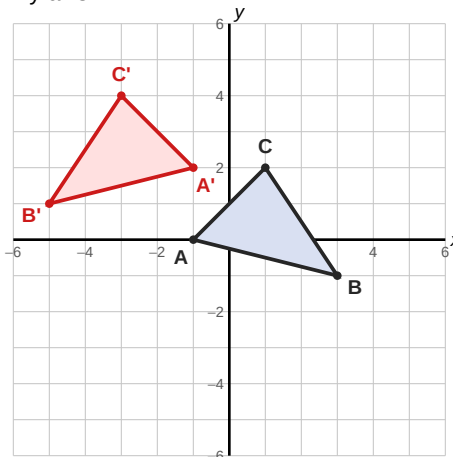


Image coordinates:

A' (-1, 2)

B' (-5, 1)

C' (-3, 4)

Original:

A (-1, 0)

B (3, -1)

C (1, 2)

5. Reflect over the line $y = x$, then rotate 180° about the origin.

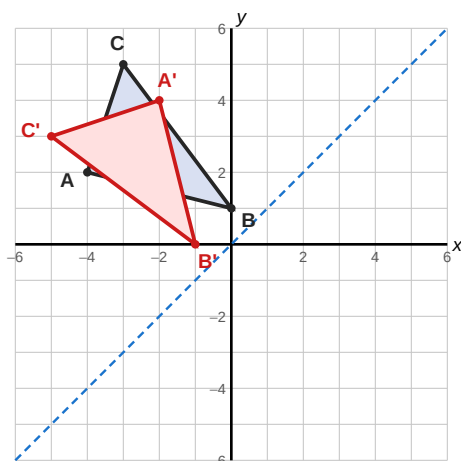


Image coordinates:

A' (-2, 4)

B' (-1, 0)

C' (-5, 3)

Original:

A (-4, 2)

B (0, 1)

C (-3, 5)

6. Rotate 180° about the origin, then translate 2 units right and 2 units up.

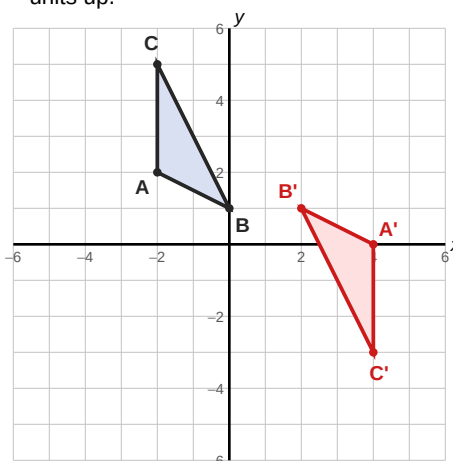


Image coordinates:

A' (4, 0)

B' (2, 1)

C' (4, -3)

Original:

A (-2, 2)

B (0, 1)

C (-2, 5)