

UNIT 5 • TRANSFORMATIONS IN THE COORDINATE PLANE

Lesson 2: Defining and Applying Rotations, Reflections, and Translations

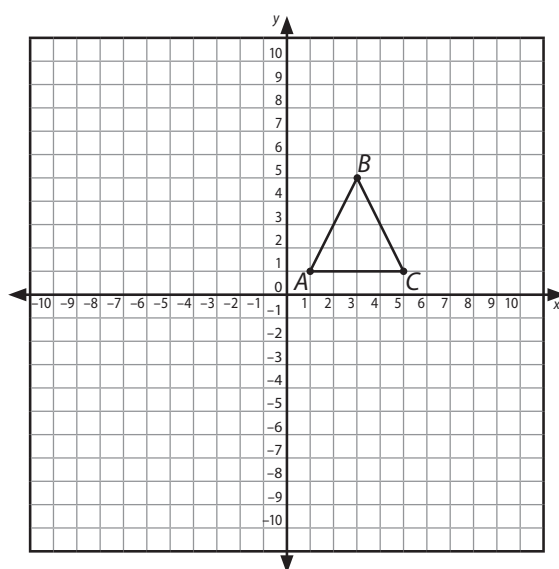
Instruction

Guided Practice 5.2.2

Example 1

Use the definitions you have learned to graph the translation $T_{2,3}(\triangle ABC)$ for which $\triangle ABC$ has the points $A(1, 1)$, $B(3, 5)$, and $C(5, 1)$.

1. On graph paper, draw the x - and y -axes and graph $\triangle ABC$ with the points $A(1, 1)$, $B(3, 5)$, and $C(5, 1)$.



2. Determine the new points.

$$A' = T_{2,3}(A) = (1+2, 1+3) = (3, 4)$$

$$T_{2,3}(\triangle ABC) = \triangle A'B'C' \text{ where } B' = T_{2,3}(B) = (3+2, 5+3) = (5, 8)$$

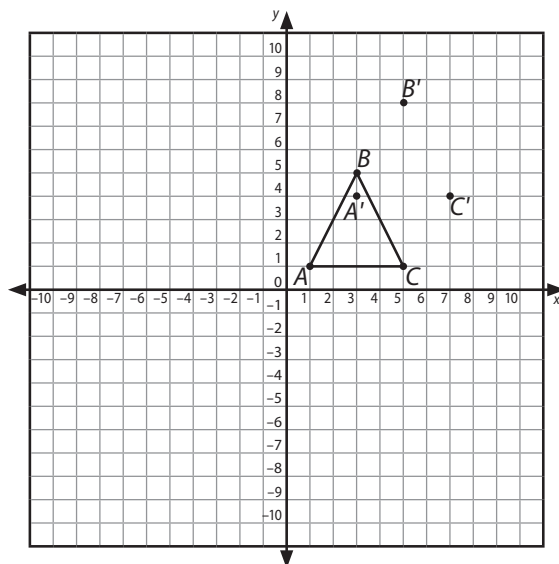
$$C' = T_{2,3}(C) = (5+2, 1+3) = (7, 4)$$

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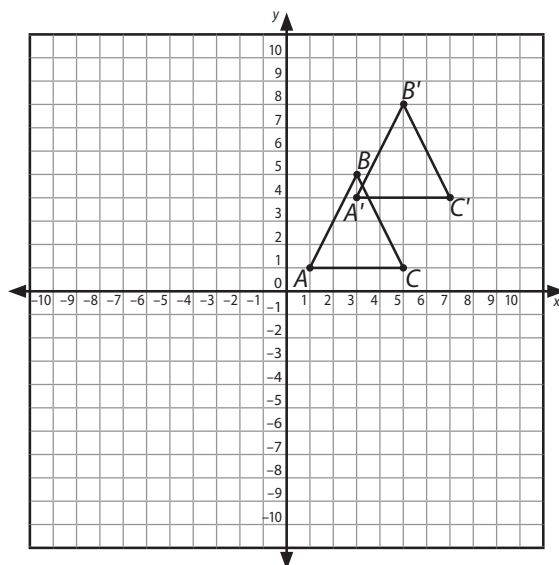
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3. Plot the new points A' , B' , and C' .



4. Connect the vertices to graph the translation $T_{2,3}$ of $\triangle ABC$.



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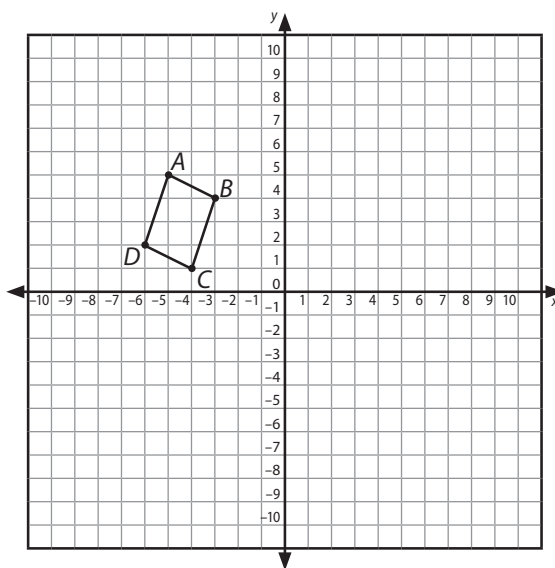
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Example 2

Use the definitions you have learned to graph the reflection of parallelogram $ABCD$, or $\square ABCD$, through the y -axis given $\square ABCD$ with the points $A(-5, 5)$, $B(-3, 4)$, $C(-4, 1)$, and $D(-6, 2)$.

1. Using graph paper, draw the x - and y -axes and graph $\square ABCD$ with $A(-5, 5)$, $B(-3, 4)$, $C(-4, 1)$, and $D(-6, 2)$.



2. Write the new points.

$$r_{y\text{-axis}}(\square ABCD) = \square A'B'C'D' \text{ where}$$

$$A' = r_{y\text{-axis}}(A) = r_{y\text{-axis}}(-5, 5) = -(-5, 5) = (5, 5)$$

$$B' = r_{y\text{-axis}}(B) = r_{y\text{-axis}}(-3, 4) = -(-3, 4) = (3, 4)$$

$$C' = r_{y\text{-axis}}(C) = r_{y\text{-axis}}(-4, 1) = -(-4, 1) = (4, 1)$$

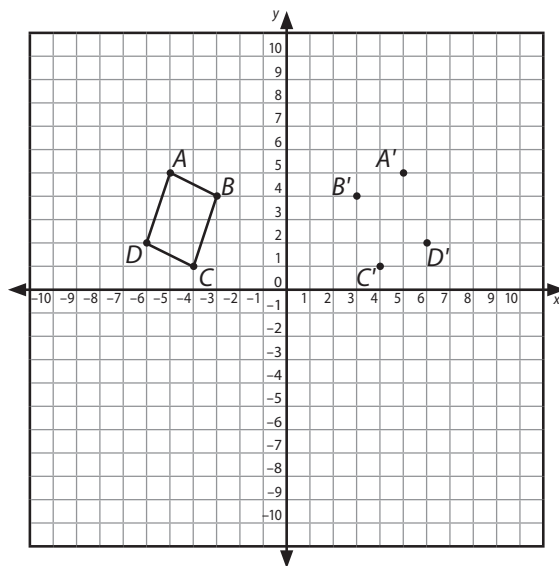
$$D' = r_{y\text{-axis}}(D) = r_{y\text{-axis}}(-6, 2) = -(-6, 2) = (6, 2)$$

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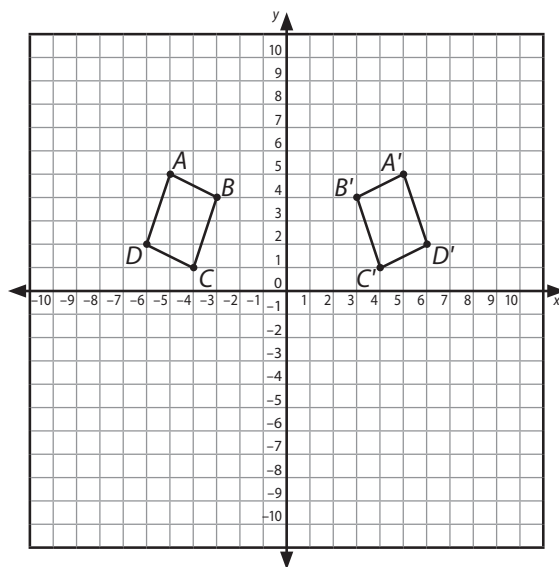
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3. Plot the new points A' , B' , C' , and D' .



4. Connect the corners of the points to graph the reflection $r_{y\text{-axis}}$ of $\square ABCD$.



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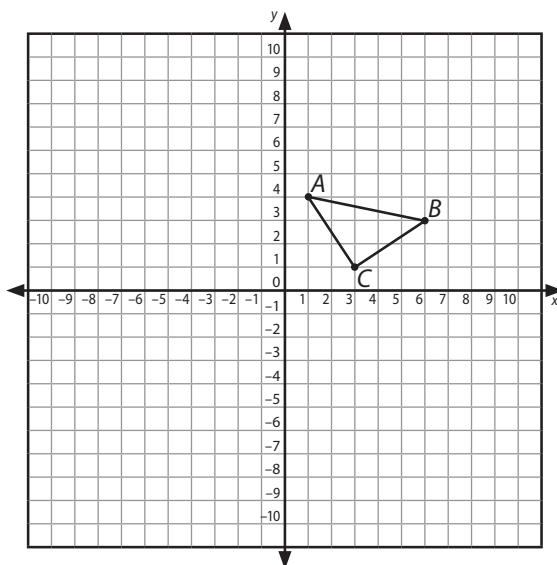
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Example 3

Using the definitions you have learned, graph a 90° rotation of $\triangle ABC$ with the points $A(1, 4)$, $B(6, 3)$, and $C(3, 1)$.

1. Using graph paper, draw the x - and y -axes and graph $\triangle ABC$ with the points $A(1, 4)$, $B(6, 3)$, and $C(3, 1)$.



2. Write the new points.

$$A' = R_{90}(A) = R_{90}(1, 4) = (-4, 1)$$

$$R_{90}(\triangle ABC) = \triangle A'B'C' \text{ where } B' = R_{90}(B) = R_{90}(6, 3) = (-3, 6)$$

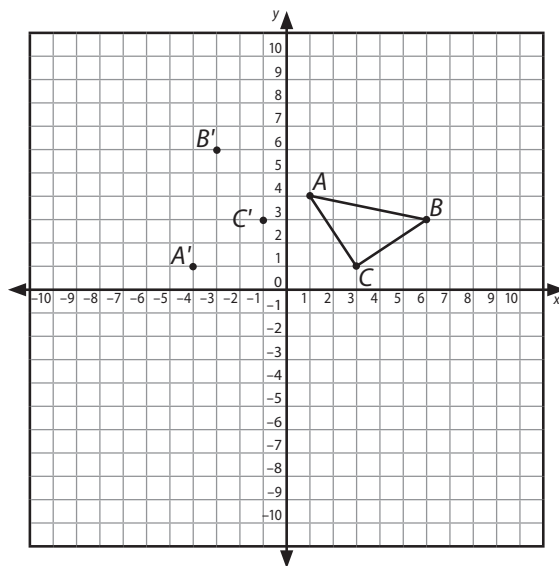
$$C' = R_{90}(C) = R_{90}(3, 1) = (-1, 3)$$

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3. Plot the new points A' , B' , and C' .



4. Connect the vertices to graph a 90° rotation of $\triangle ABC$.

