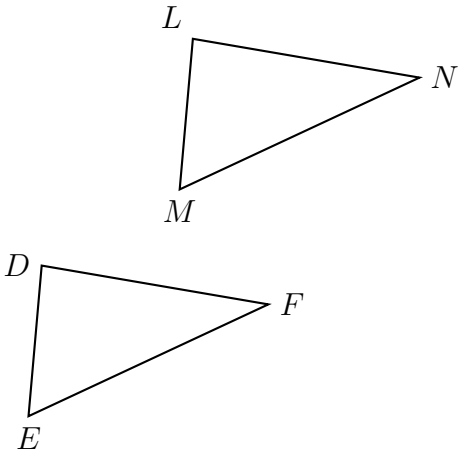
**8.5 Homework: Mixed congruence transformations** **CCSS.HSG.CO.A.5**

1. A translation maps triangle $DEF$ onto triangle $LMN$.

   Write the letter or letters for each corresponding object.




   (a) $E \rightarrow$

   (b) $F \rightarrow$

   (c) $DF \rightarrow$

Auto scoring is turned on. Correct your errors.

2. A translation maps $A$ to $A'$, as shown, $A(7,1) \rightarrow A'(2,3)$.

   (a) Which direction is the slide?

   (A) Up, to the right

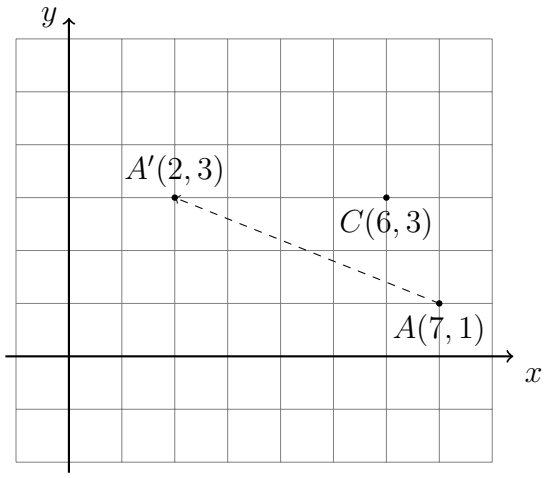
   (B) Up, to the left

   (C) Down, to the right

   (D) Down, to the left

   (E) None of the above

   (b) If the same translation is applied to $C(6,3) \rightarrow C'(x,y)$, write the point $C'$ as an ordered pair in the box. (with parenthesis)

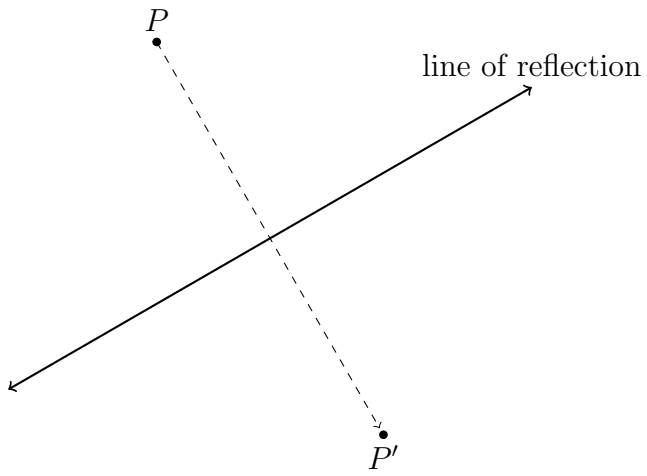



3. Take notes: *Reflection* is a transformation, also called "flipping." Reflection is like looking in the mirror.

   (a) Lengths and angles are maintained (it is a rigid motion, or isometry)

   (b) The *orientation* is reversed. (letters are all backwards)

(c) The *line of reflection* is a perpendicular bisector of the segment connecting a reflected point to its image.

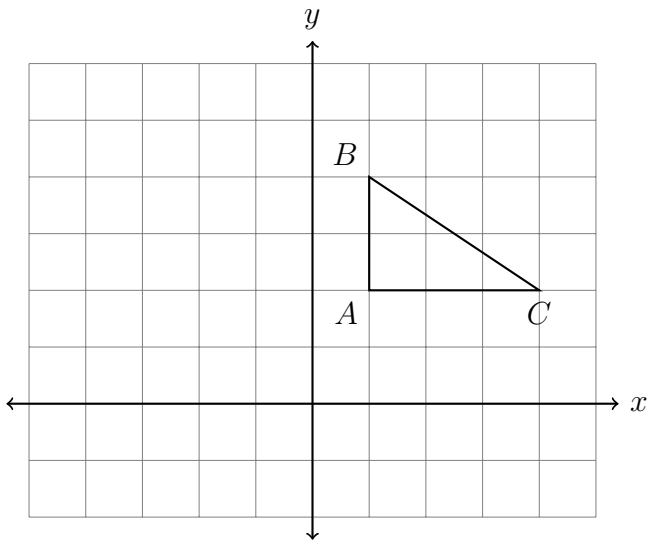



4. Reflect the triangle across the $y$-axis, $\triangle ABC \to \triangle A'B'C'$. Complete the table of the coordinates and plot and label the image on the grid.

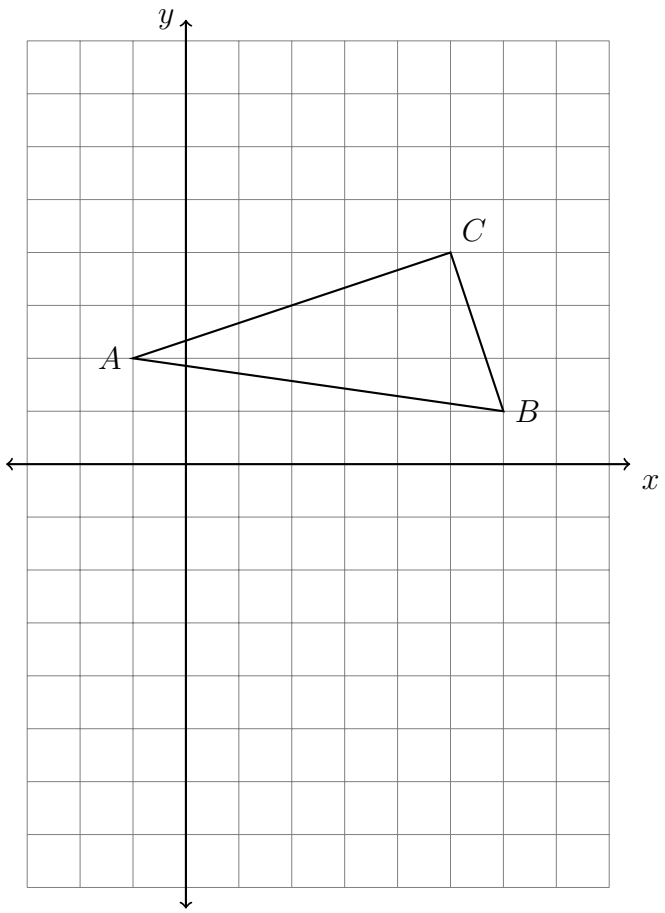
$A(1,2) \to$

$B(1,4) \to$

$C(4,2) \to$

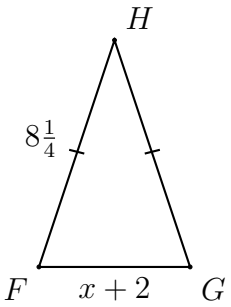



5. $\triangle ABC$ is shown with vertices $A(-1,2)$, $B(6,1)$, and $C(5,4)$. Reflect the triangle across the $x$-axis. Write down its coordinates in a table and plot and label it on the graph.




6. The perimeter of the isosceles $\triangle FGH$ is $19\frac{1}{2}$ with $\overline{FH} \cong \overline{GH}$. If $FG = x + 2$ and $FH = 8\frac{1}{4}$, find $x$.

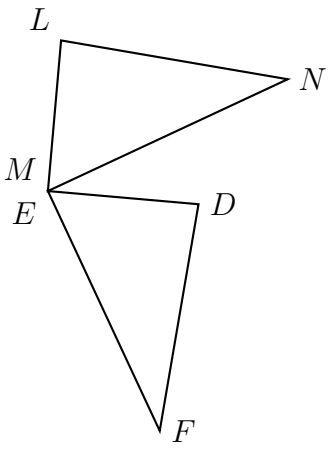
   Show your work with an equation.




   Write the value of $x$ in the box.

7. A rotation maps triangle $DEF$ onto triangle $LMN$.

   Write the letter or letters for each corresponding object.




(a) $E \rightarrow$

(b) $F \rightarrow$

(c) $DF \rightarrow$

8. A rotation centered at the origin maps $A$ to $A'$, as shown, $A(3,1) \rightarrow A'(-1,3)$.

   (a) Which correctly identifies the rotation?

   (A) Clockwise 180°

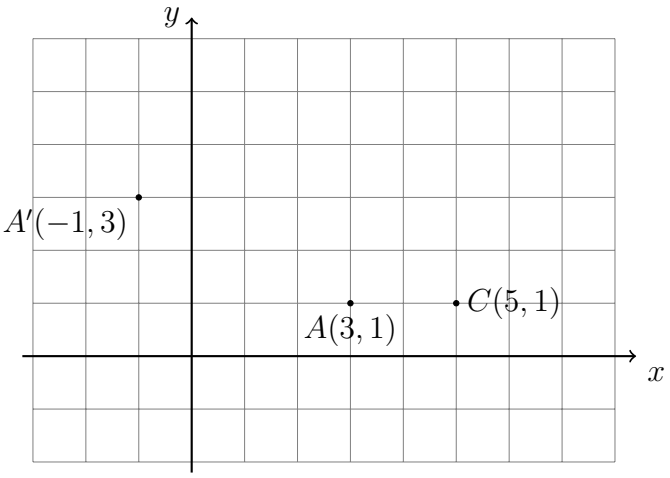
   (B) Counter clockwise 180°

   (C) Clockwise 90°

   (D) Counter clockwise 90°

   (E) None of the above

   (b) If the same translation is applied to $C(5,1) \rightarrow C'(x,y)$, plot and label the point $C'$ as an ordered pair.

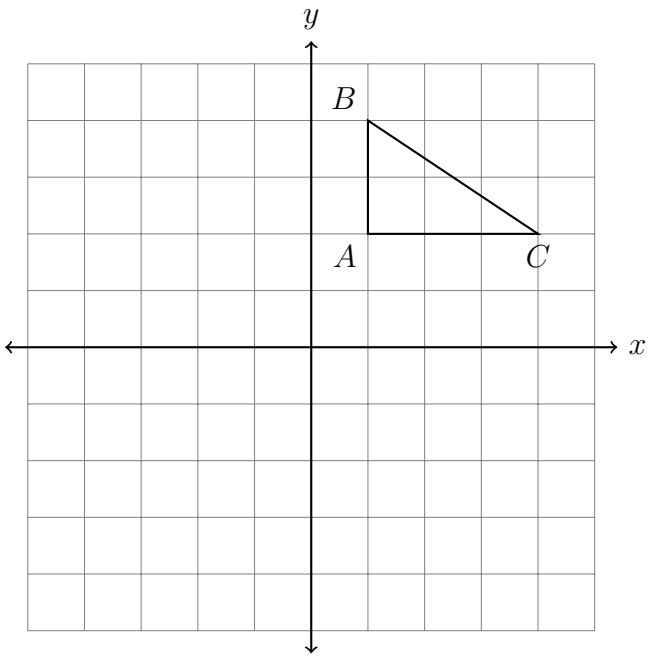



9. Rotate the triangle 90° clockwise around the origin, $\triangle ABC \rightarrow \triangle A'B'C'$. Complete the table of the coordinates and plot and label the image on the grid.

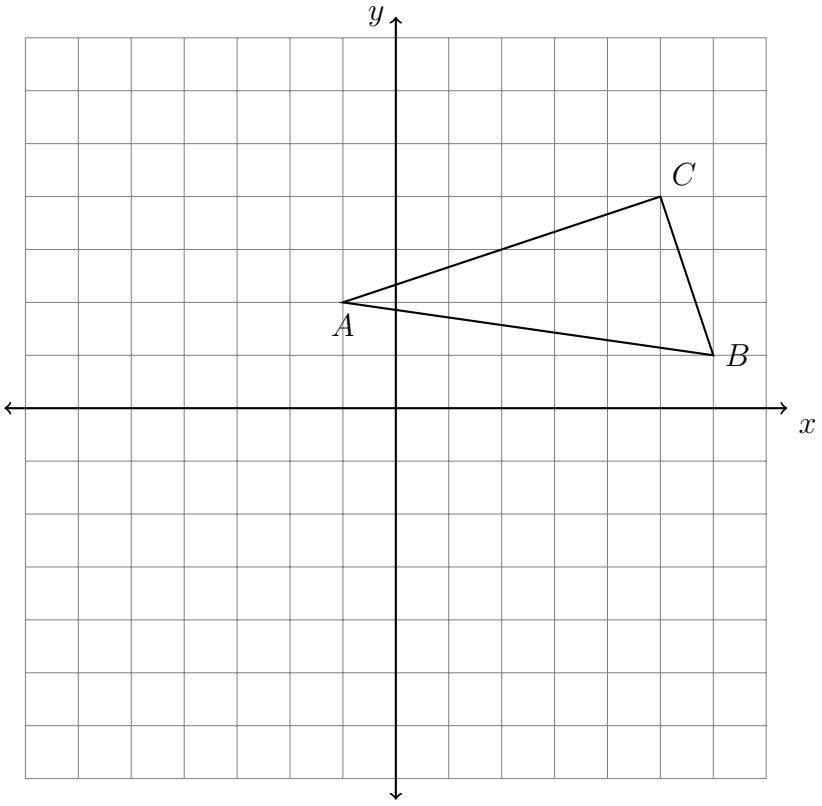
$A(1,2) \rightarrow$

$B(1,4) \rightarrow$

$C(4,2) \rightarrow$



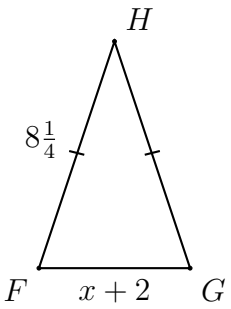

10. $\triangle ABC$ is shown with vertices $A(-1, 2)$, $B(6, 1)$, and $C(5, 4)$. Rotate the triangle 90° counter clockwise around the origin. Write down its coordinates in a table and plot and label it on the graph.




11. The perimeter of the isosceles $\triangle FGH$ is $19\frac{1}{2}$ with $\overline{FH} \cong \overline{GH}$. If $FG = x + 2$ and

$FH = 8\frac{1}{4}$, find $x$.

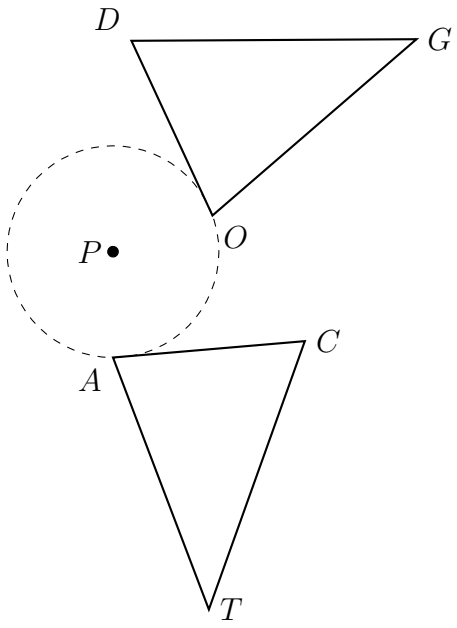
Show your work with an equation.




Write the value of $x$ in the box.

12. A 110° counterclockwise rotation centered at $P$ maps triangle $CAT$ onto triangle $DOG$.

Write the letter or letters for each corresponding object.




(a) $T \rightarrow$

(b) $A \rightarrow$

(c) $AC \rightarrow$

13. A translation maps $A$ to $A'$, as shown, $A(6, 5) \rightarrow A'(2, 2)$.

(a) Apply the same translation to $C(7, 2) \rightarrow C'(x, y)$ on the grid. Mark and label point $C'$ as an ordered pair.

(b) Which direction is the slide?

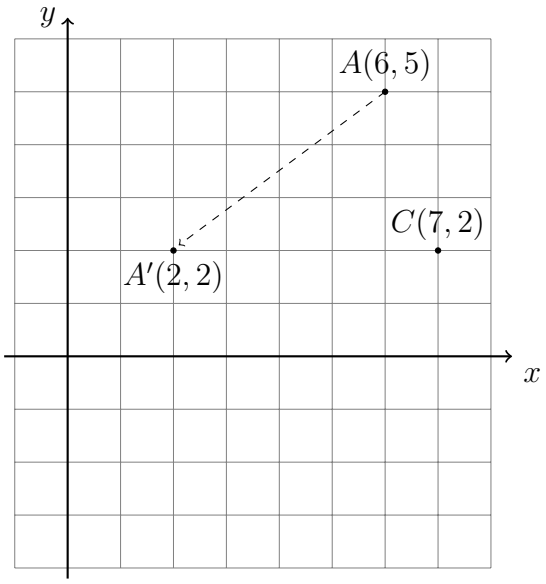
(A) Up, to the right

(B) Up, to the left

(C) Down, to the right

(D) Down, to the left

(E) None of the above



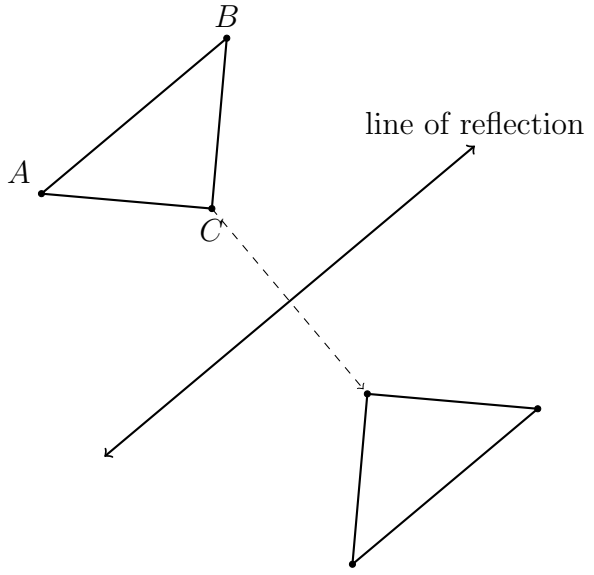

14. Complete the reflection diagram of $\triangle ABC \to \triangle A'B'C'$, below.

    (a) Label the triangle image.

    (b) True or false: reflection is a rigid motion.

    (c) Is the *orientation* maintained or reversed by the reflection?

    (d) What is the degree measure of the angle between the *line of reflection* and the dotted line segment from point $C$ to its image?




15. A rotation centered at the origin maps $A$ to $A'$, as shown, $A(3, -1) \to A'(1, 3)$.

(a) Apply the same rotation $C(5,1) \to C'(x,y)$, plotting and labeling the point $C'$ as an ordered pair.

(b) Which correctly identifies the rotation?

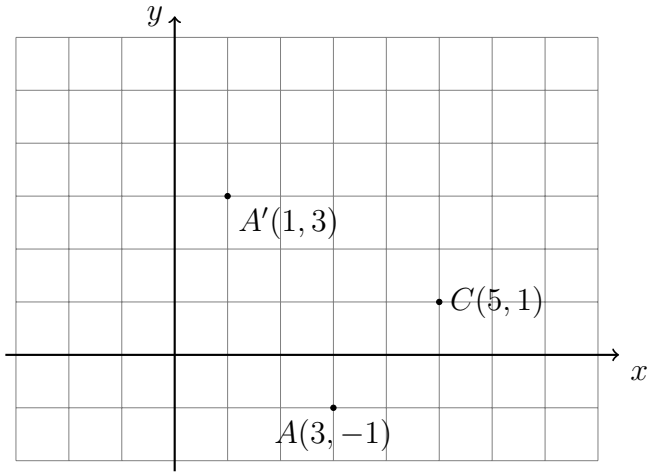
(A) Clockwise 180°

(B) Counter clockwise 180°

(C) Clockwise 90°

(D) Counter clockwise 90°

(E) None of the above

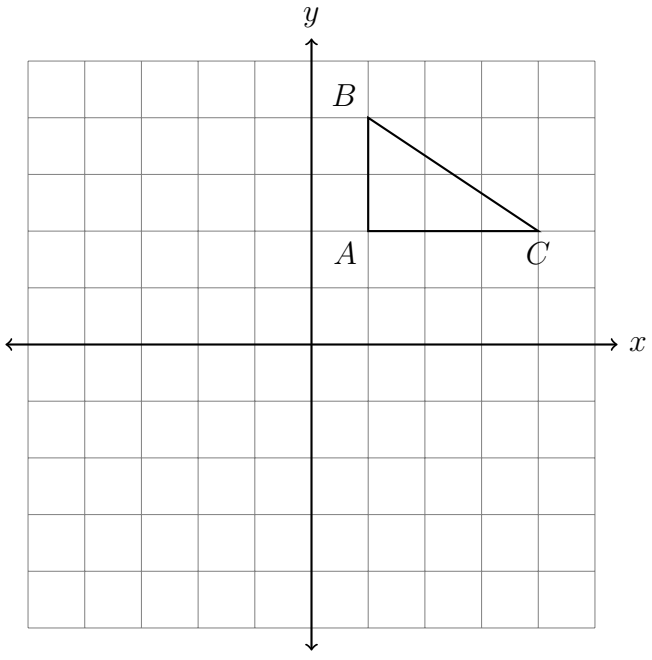



16. Reflect the triangle across the $x$-axis, $\triangle ABC \to \triangle A'B'C'$. Complete the table of the coordinates and plot and label the image on the grid.

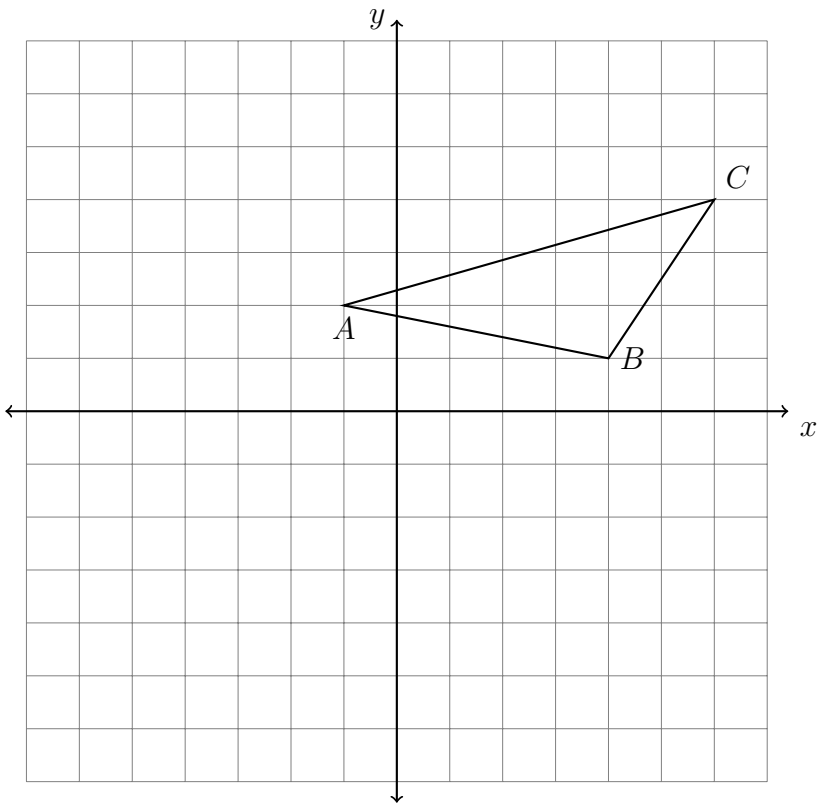
$A(1,2) \to$

$B(1,4) \to$

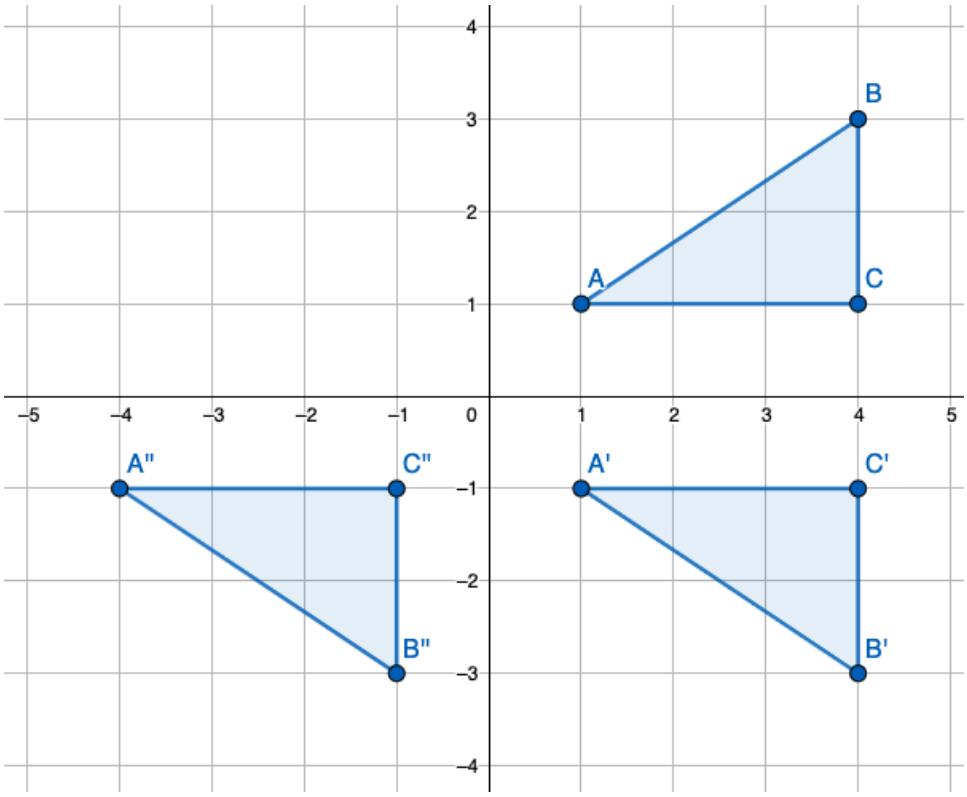
$C(4,2) \to$




17. $\triangle ABC$ is shown with vertices $A(-1,2)$, $B(4,1)$, and $C(6,4)$. Rotate the triangle 90° clockwise around the origin. Write down its coordinates in a table and plot and label it on the graph.




18. A composition of two transformations is applied to $\triangle ABC$, shown in the diagram. Fully characterize the two transformations, in order.

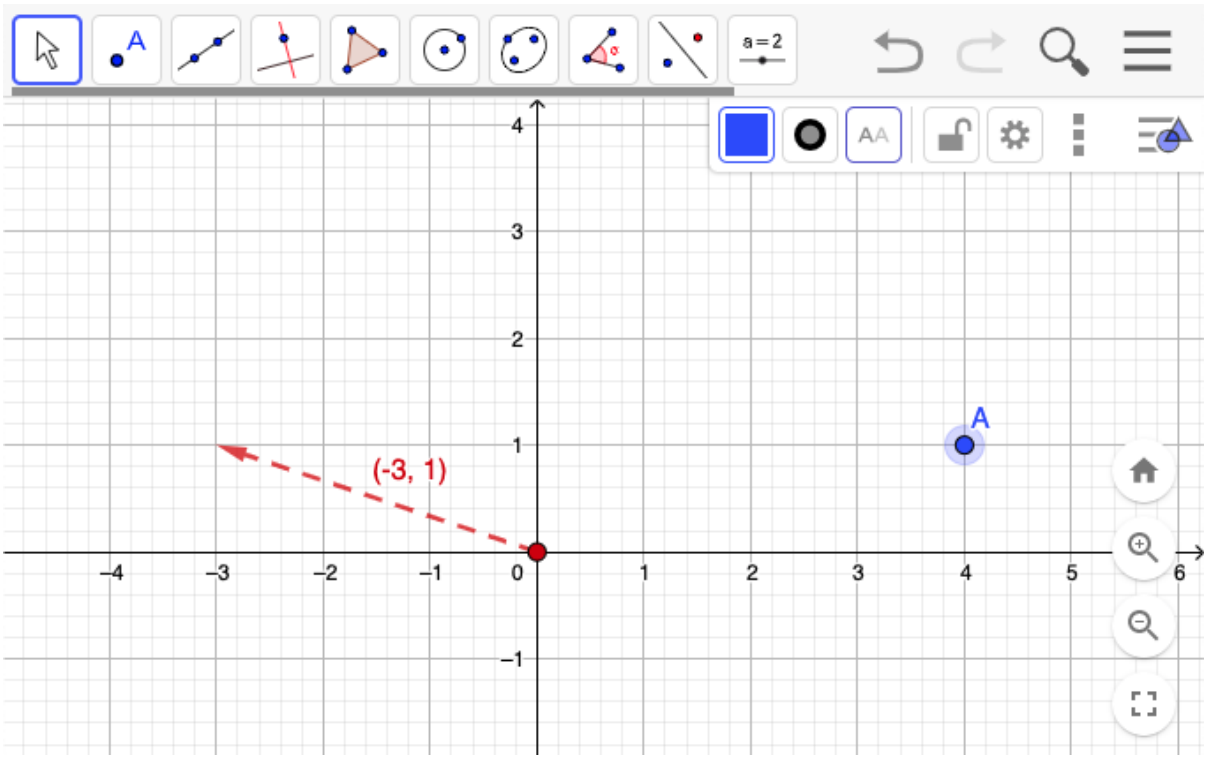


19. A point labeled $A$ and vector $(-3, 1)$ are shown Geogebra/classic. Identify the following objects and tools.

    (a) Circle the vector

    (b) Make an "X" where to click for the menu "Name & Value" that will label point $A$ as an ordered pair.

    (c) Mark with an arrow the menu where the "Translate by vector" tool is found.




20. Perform a composition of two transformations using Geogebra/classic. Paste an image of your work in this Classkick slide using the "camera" tool.

    (a) Plot $\triangle ABC$, $A(1, 2)$, $B(4, 3)$, $C(5, 6)$

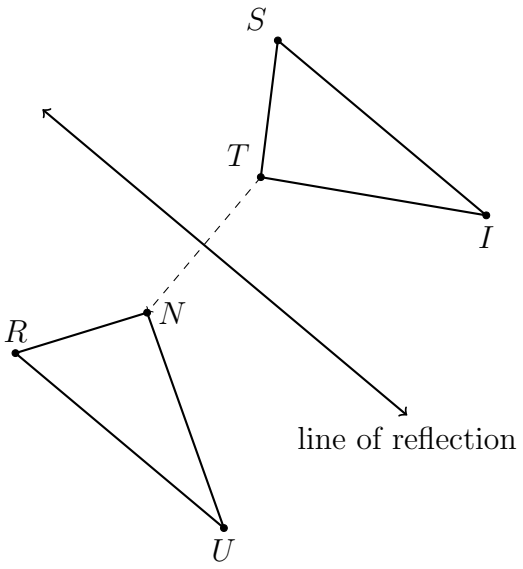
    (b) Mark a point at the origin.

    (c) Rotate the triangle $90°$ clockwise around the origin.

    (d) Reflect the image $\triangle A'B'C'$ across the $y$-axis.

21. A reflection is performed on a triangle, $\triangle SIT \rightarrow \triangle RUN$, as shown below.

    Write the letter or letters for each corresponding object.



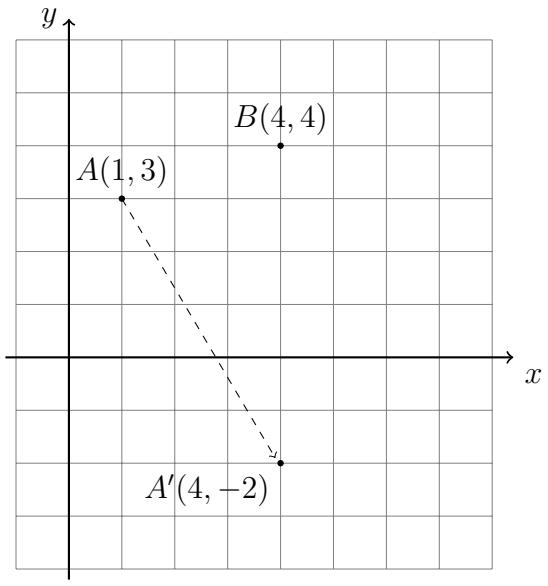

(a) $S \rightarrow$

(b) $T \rightarrow$

(c) $SI \rightarrow$

22. A translation maps $A$ to $A'$, as shown, $A(1,3) \rightarrow A'(4,-2)$.

(a) Apply the same translation to $B(4,4) \rightarrow B'(x,y)$ on the grid. Mark and label point $B'$ as an ordered pair.




(b) Which translation mapped $A \rightarrow A'$?

(A) Right 3, up 1

(B) Left 3, down 1

(C) Right 5, down 3

(D) Right 3, down 5

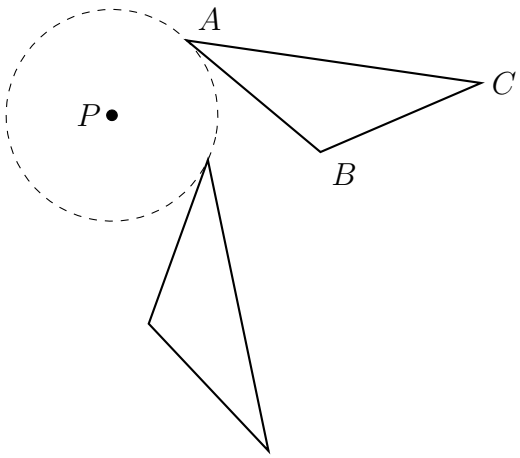
(E) None of the above

23. A 70° clockwise rotation centered at $P$ maps $\triangle ABC \rightarrow \triangle A'B'C'$, below.

(a) Complete the diagram by labeling the vertices of the triangle image. (remember the primes)

(b) True or false: rotation is a rigid motion.

(c) Is the *orientation* maintained or reversed by the rotation?




24. A reflection is performed on a line segment, mapping $\overline{AB} \to \overline{A'B'}$, as shown.

    (a) Apply the same reflection to $C$.
    Plot and label the image $C'$ as an ordered pair.

    (b) Which correctly identifies the reflection?

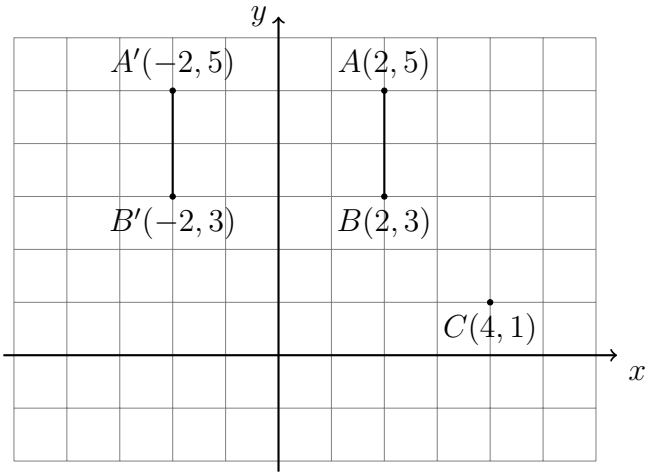
    (A) Reflect over the $x$-axis

    (B) Reflect over the $y$-axis

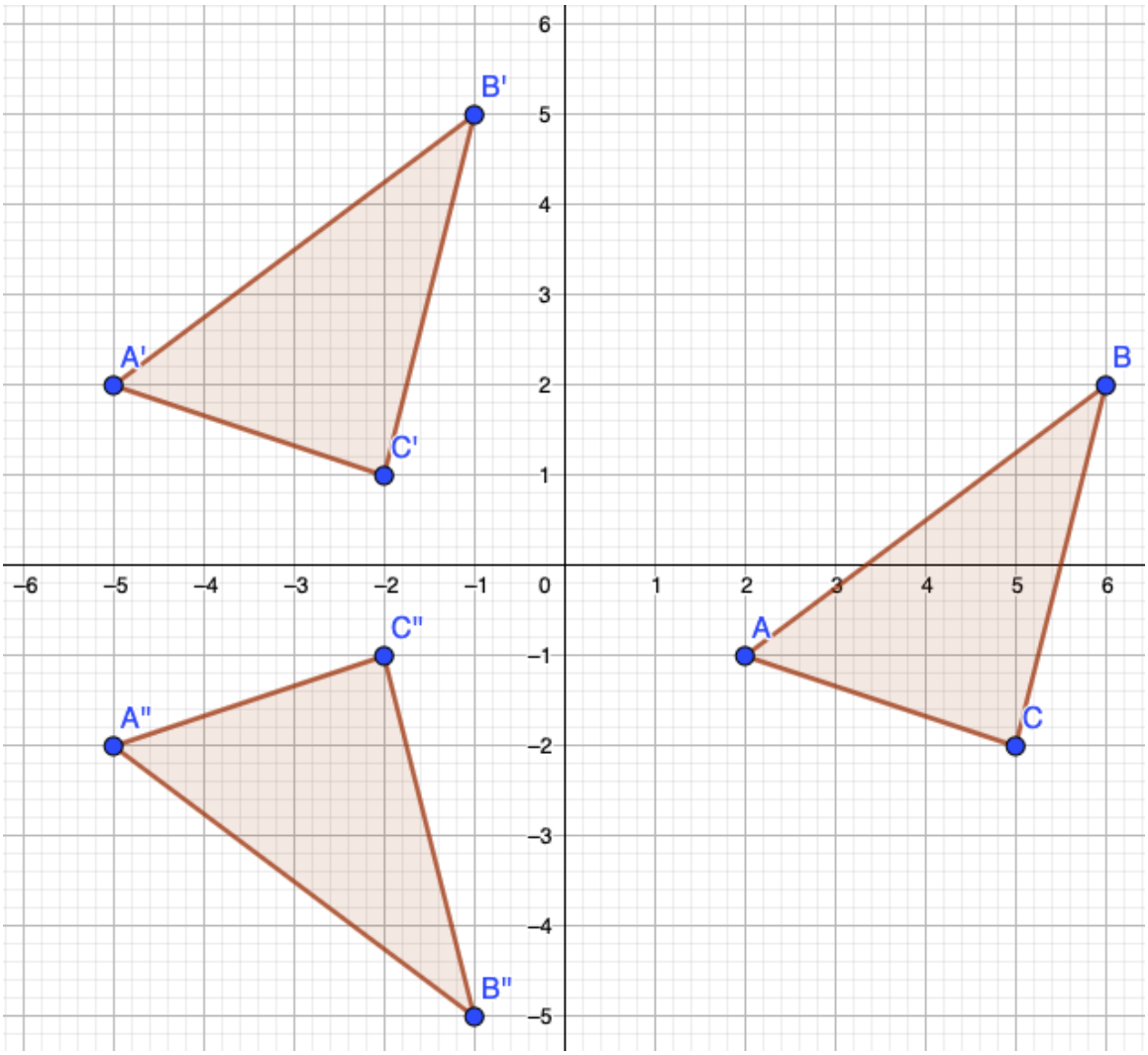
    (C) Reflect over the $x$-axis, then the $y$-axis

    (D) Reflect over the $y$-axis, then the $x$-axis

    (E) None of the above




25. What are the two transformations applied mapping $\triangle ABC \to \triangle A'B'C' \to \triangle A''B''C''$, as shown in the diagram? *Fully characterize* the two transformations, in order.

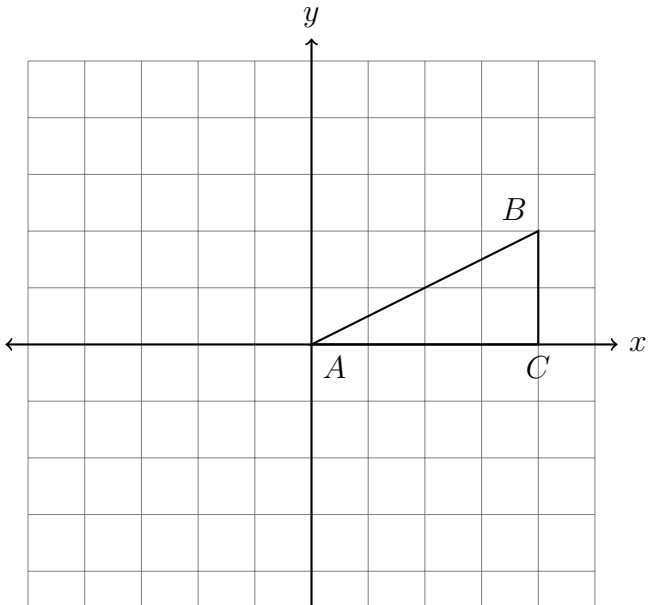



26. Rotate the triangle 180° counterclockwise around the origin, $\triangle ABC \rightarrow \triangle A'B'C'$. Complete the table of the coordinates and plot and label the image on the grid.

$A(0,0) \rightarrow$

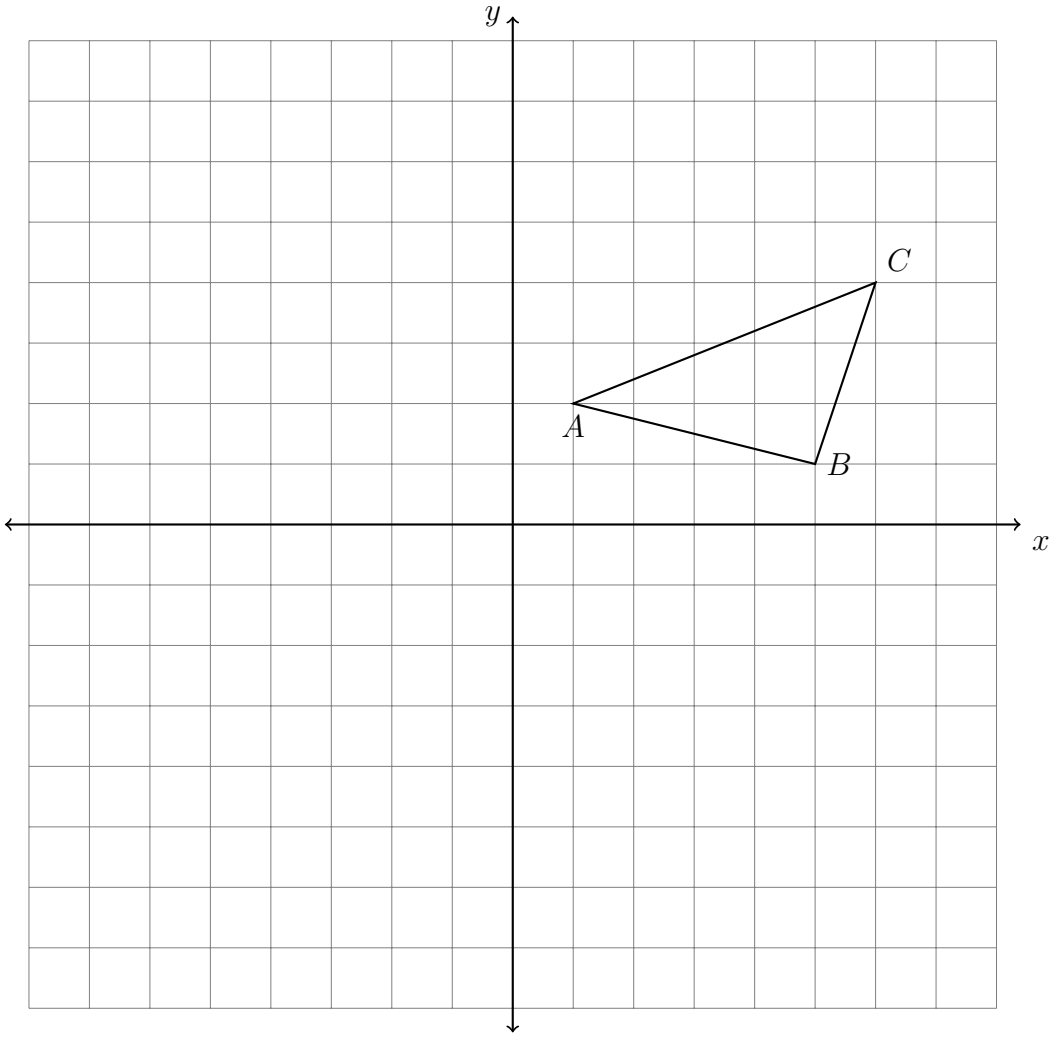
$B(4,2) \rightarrow$

$C(4,0) \rightarrow$



27. $\triangle ABC$ is shown with vertices $A(1,2)$, $B(5,1)$, and $C(6,4)$. First, translate the triangle left 7 and up 2, then reflect it across the $x$-axis.

    Plot and label $\triangle A'B'C'$ and $\triangle A''B''C''$ on the graph.

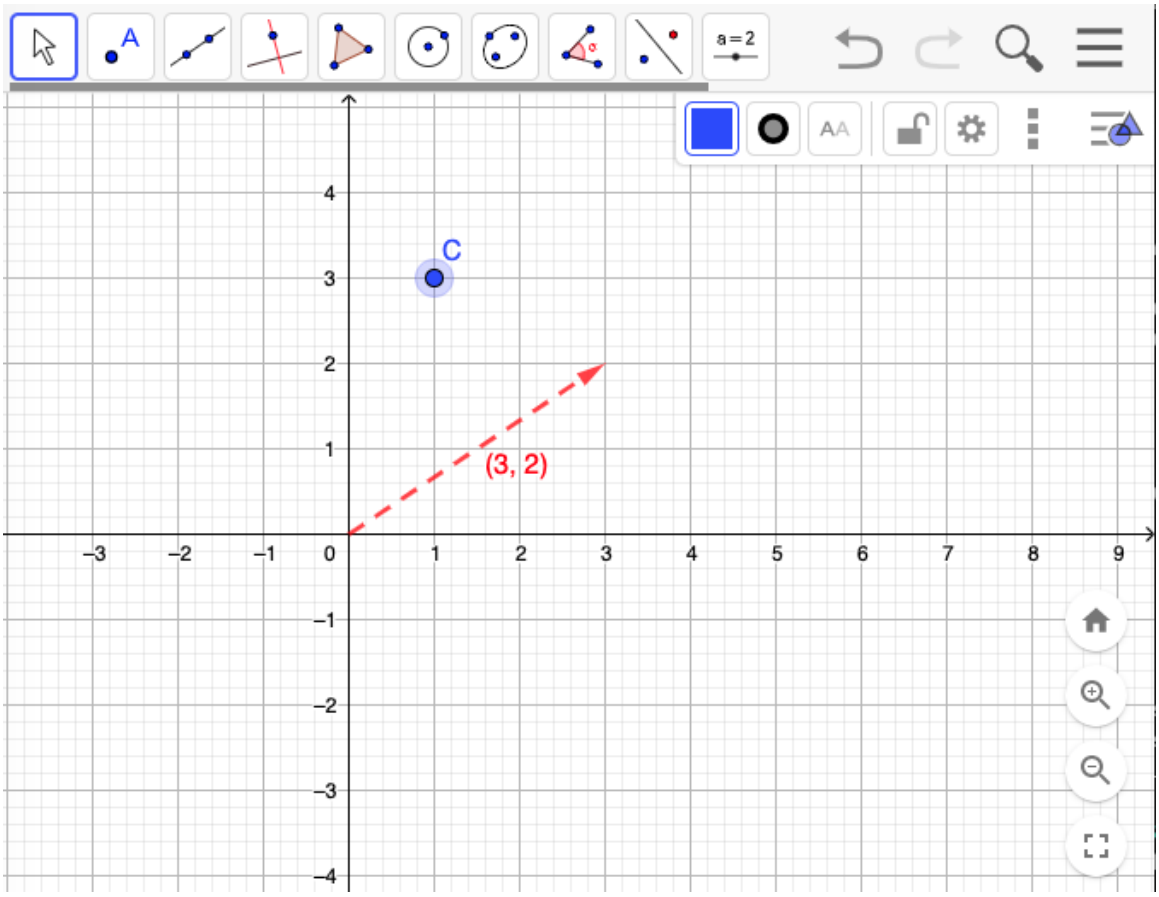



28. A point labeled $C$ and vector $(1,3)$ are shown Geogebra/classic. Identify the following objects and tools.

    (a) Circle the vector

    (b) Make an "X" where to click for the menu "Name & Value" that will label point $C$ as an ordered pair.

    (c) Mark with an arrow the menu where the "Translate by vector" tool is found.




29. Perform a composition of two transformations using Geogebra/classic. Paste an image of your work in this Classkick slide using the "camera" tool.

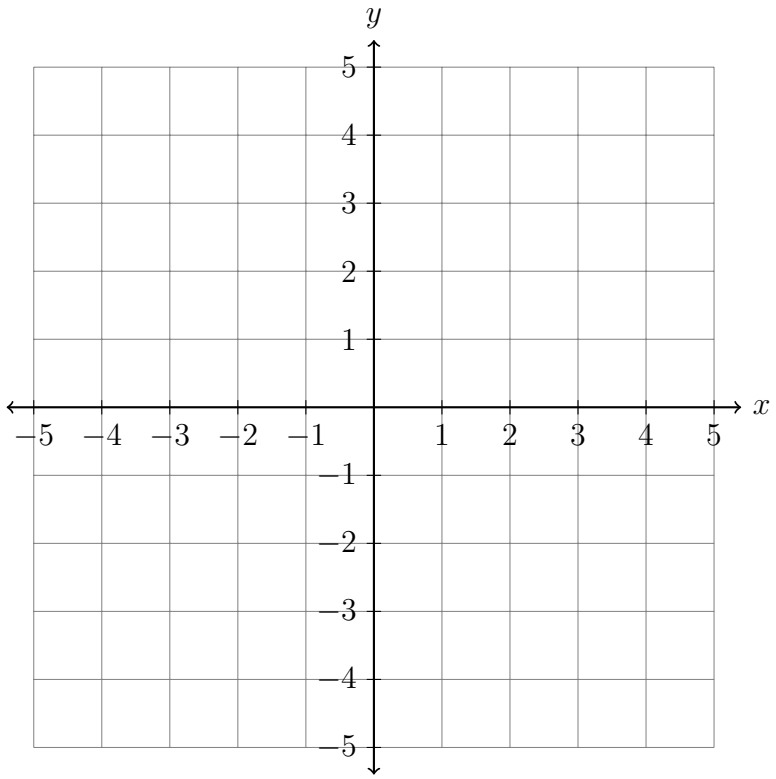
    (a) Plot $\triangle ABC$, $A(2,1)$, $B(5,4)$, $C(5,1)$

    (b) Mark a point at the origin.

    (c) Rotate the triangle 180° counter clockwise around the origin.

    (d) Reflect the image $\triangle A'B'C'$ across the $y$-axis, producing $\triangle A''B''C''$.

30. Plot the parallelogram $BECA$ with $B(-2,-1)$, $E(3,-1)$, $C(2,-4)$, and $A(-3,-4)$. Translate the quadrilateral up 5 and right 2, labeling it $B'E'C'A'$. (use a straight edge for full credit)

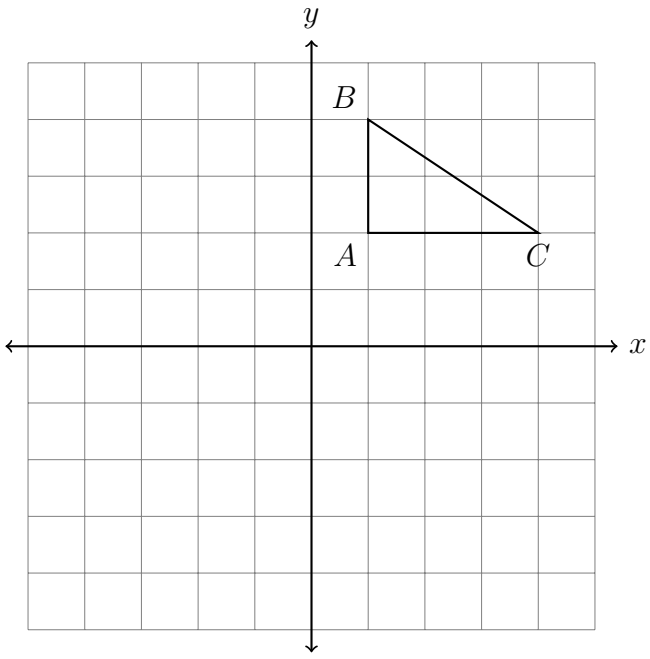



31. Reflect the triangle over the $x$-axis, $\triangle ABC \to \triangle A'B'C'$. Complete the table of the coordinates and plot and label the image on the grid.

$A(1,2) \to$

$B(1,4) \to$

$C(4,2) \to$

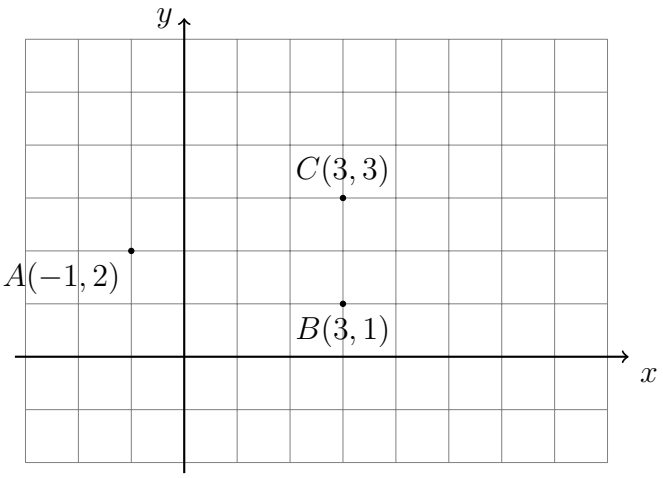


32. A translation is performed mapping $(x, y) \to (x + 4, y - 1)$.

    (a) What is the horizontal shift, how many squares right or left?

    (b) What is the vertical shift, how many squares up or down?

    (c) Identify the image of point $A$. $A(-1, 2) \to$

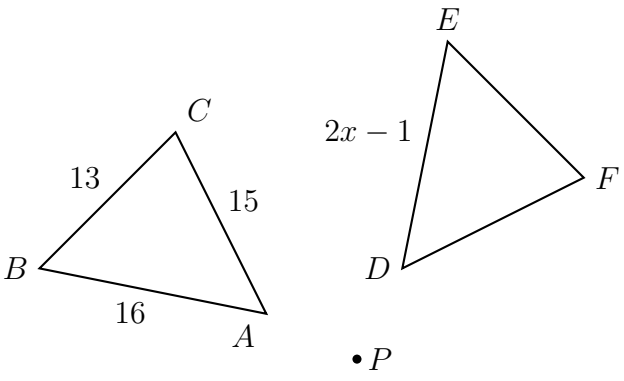



33. In the diagram below, $\triangle ABC$ with sides of 13, 15, and 16, is mapped onto $\triangle DEF$ after a clockwise rotation of 90° about point $P$.

    (a) What is $A$ mapped to? $A \to$

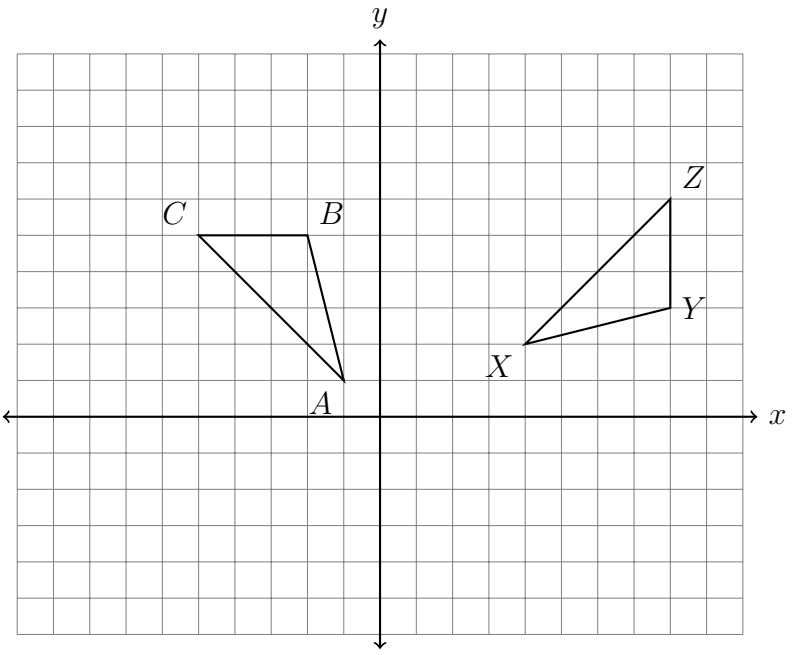
    (b) What corresponds to $F$?

    (c) Given $DE = 2x - 1$. Find $x$.




34. A translation maps $D(2, 4) \to D'(-3, 4)$. What is the image of $E(5, -5)$ under the same translation?

35. The triangle $ABC$, shown below, undergoes two rigid motions carrying it onto triangle $XYZ$. State the two isometric transformations. (be specific)




36. Triangle $\triangle ABC$ is graphed on the set of axes below. The vertices of $\triangle ABC$ have the coordinates $A(2, -3)$, $B(8, 1)$, and $C(-1, 8)$.

    Reflect the triangle across the $y$-axis. Write down its coordinates in a table and plot and label it on the graph.