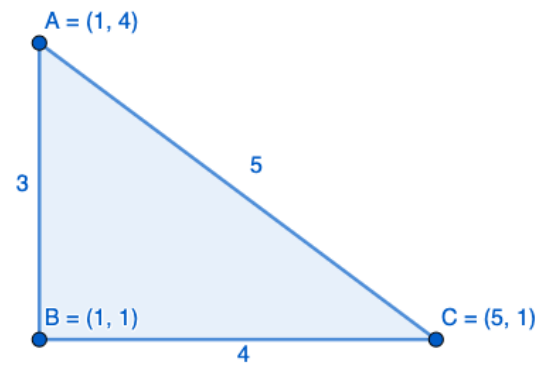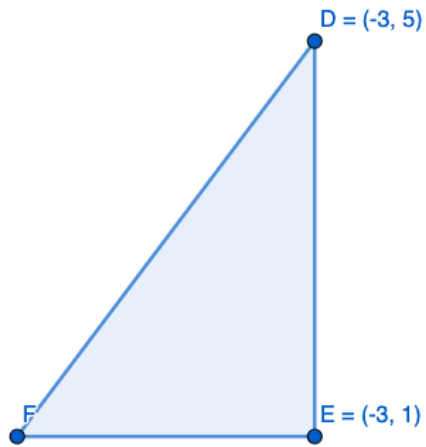# Math 7 Plus Unit 4
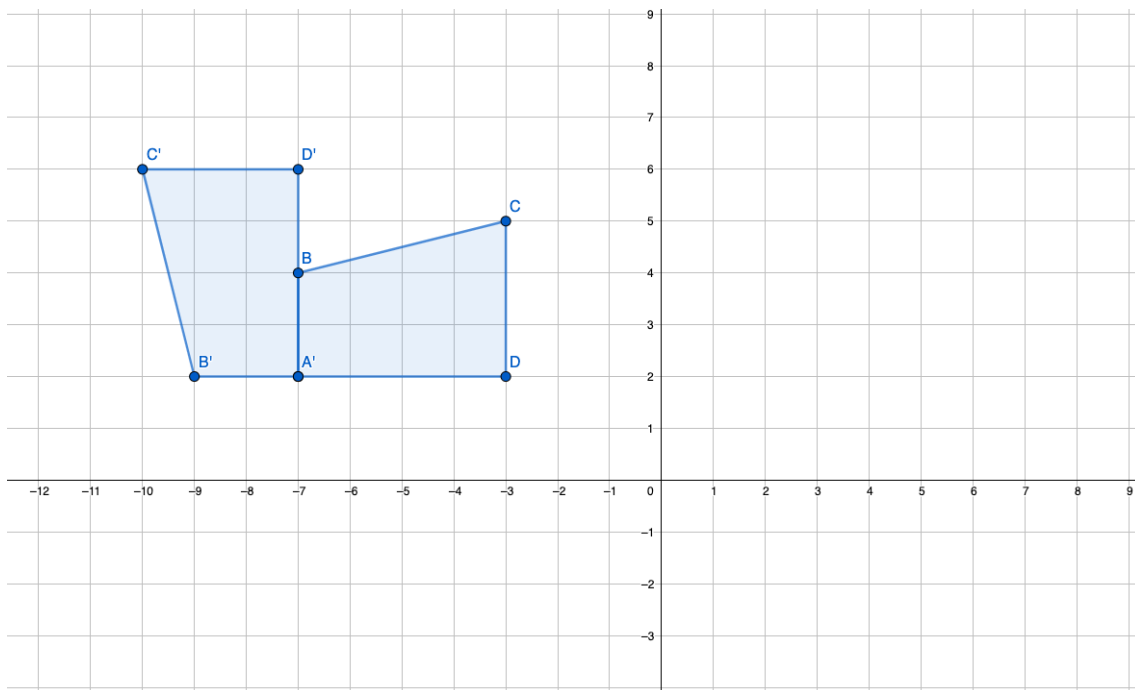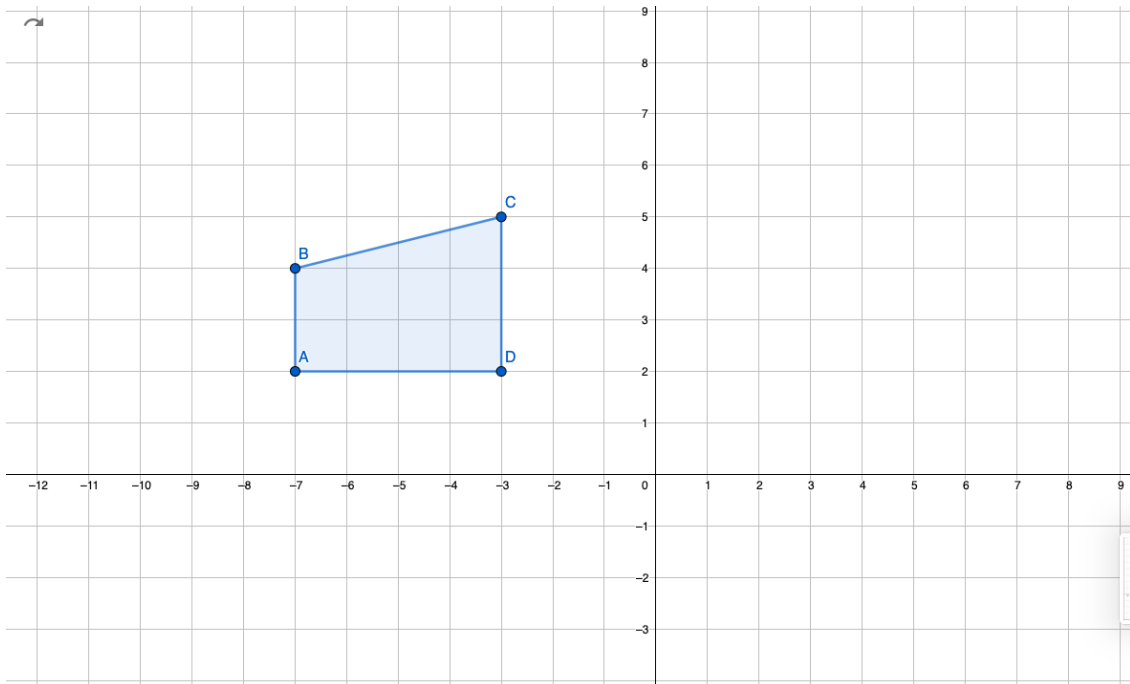## Rigid Transformations & Congruence
Additional Practice Problems KEY

1. The two triangles shown are congruent. Given the characteristics of congruent shapes, find the x-coordinate of point F.
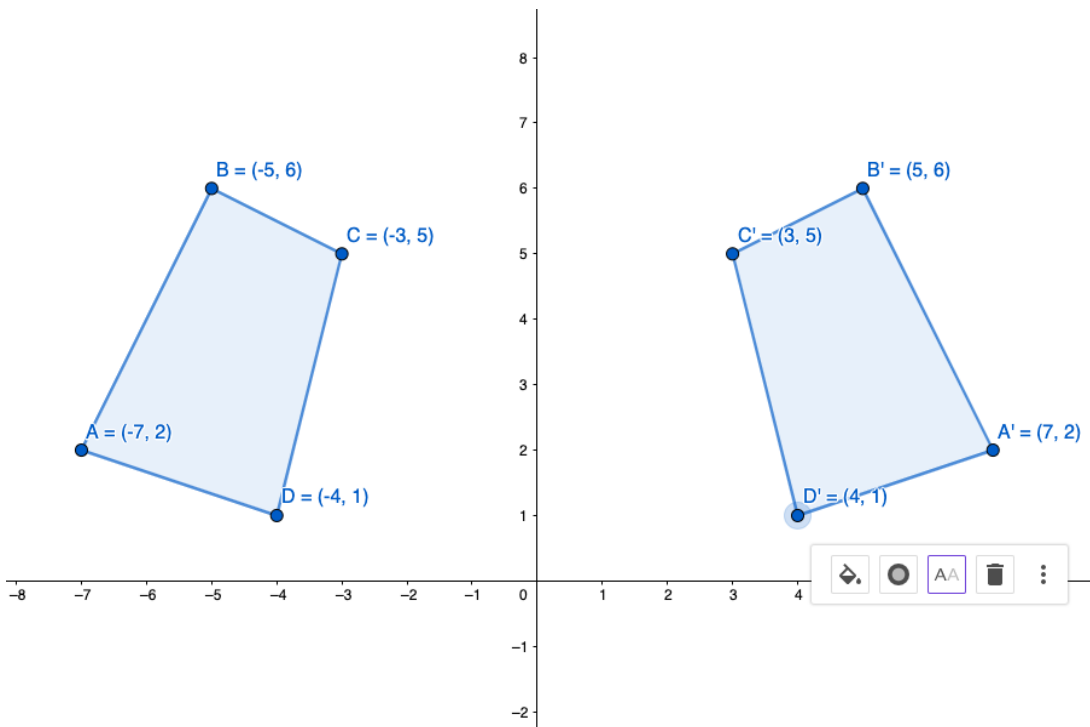
D = (-3, 5)

A = (1, 4)

5

3

E = (-3, 1)

B = (1, 1)

C = (5, 1)

4

F

F = (-6, 1)

2. Rotate the quadrilateral 90° counterclockwise around point A. Draw the new figure on the same set of axes.

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3. Figure ABCD has been reflected over the y-axis. Give the coordinates of its vertices.
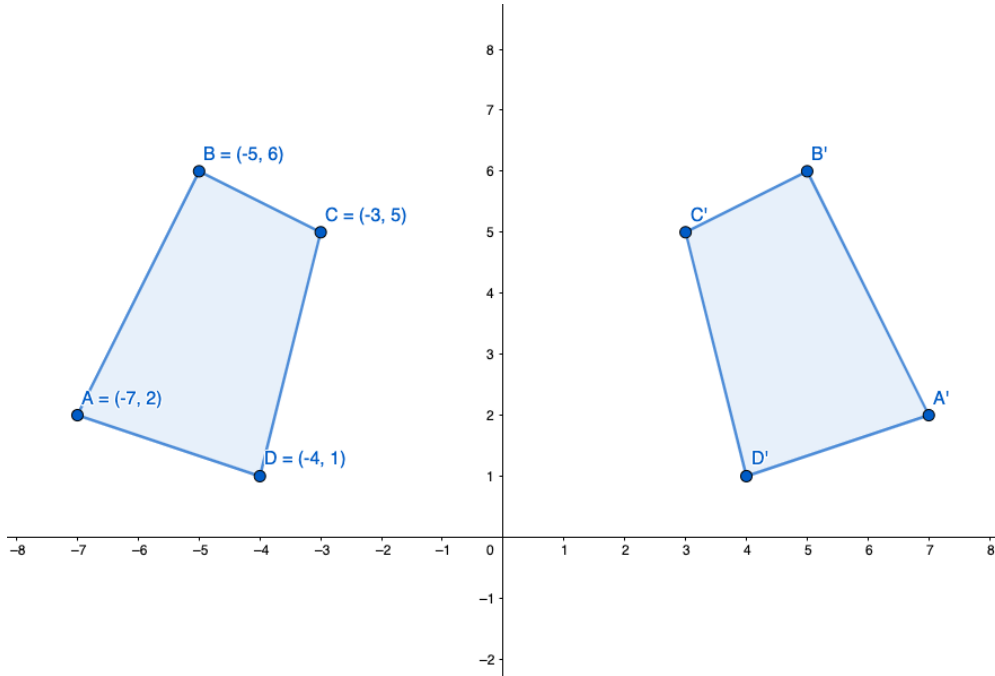
B = (-5, 6)
C = (-3, 5)
A = (-7, 2)
D = (-4, 1)

B'
C'
A'
D'

B = (-5, 6)
C = (-3, 5)
A = (-7, 2)
D = (-4, 1)

B' = (5, 6)
C' = (3, 5)
A' = (7, 2)
D' = (4, 1)

4. Lines AB and CF are parallel. Given the measure of angle BDE = 70°, explain why the measure of angle HEF is 110°.
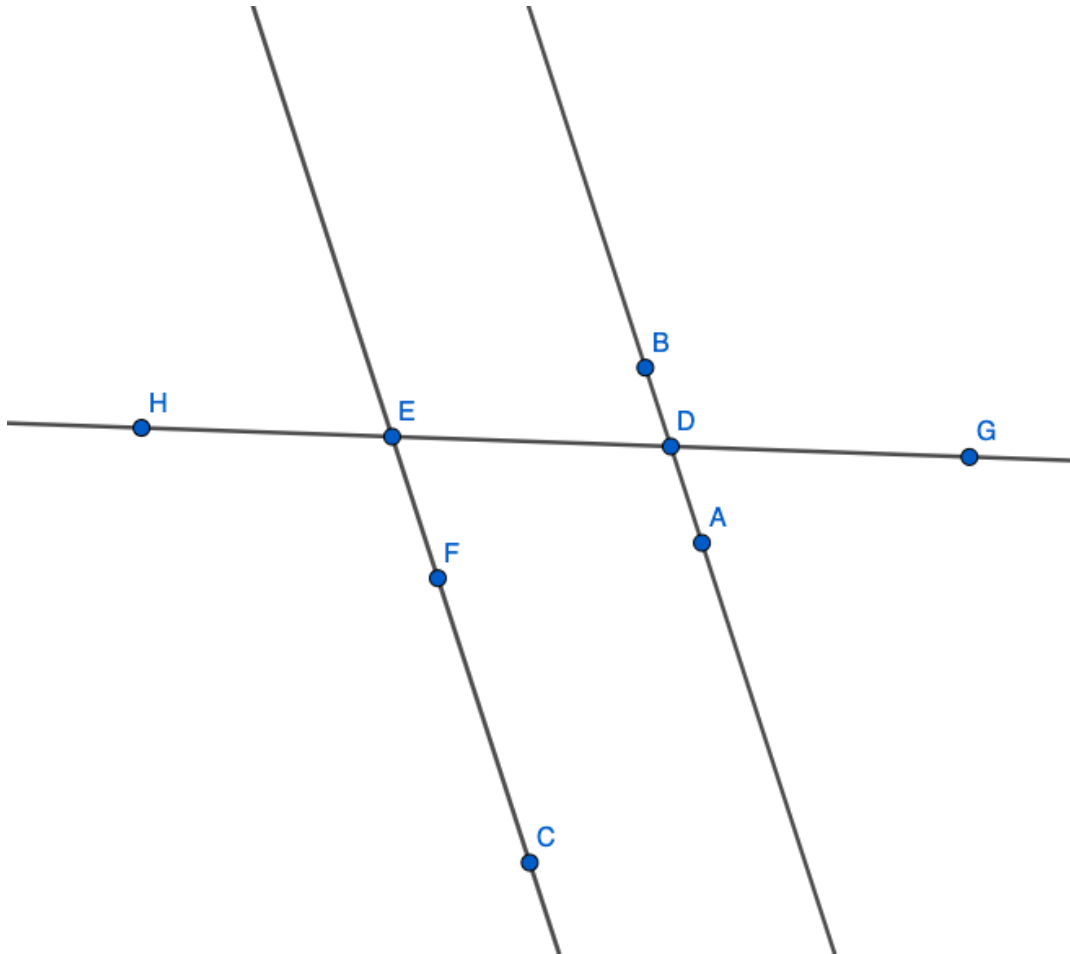
If angle BDE = 70°, then angle ADE is 110° since those two angles are supplementary. Angles EDA and HEF are corresponding angles. Corresponding angles are congruent, so EDA and HEF are both 110°.

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5. Describe a rotation that would take figure ABC into the third quadrant using the origin as the center of rotation.
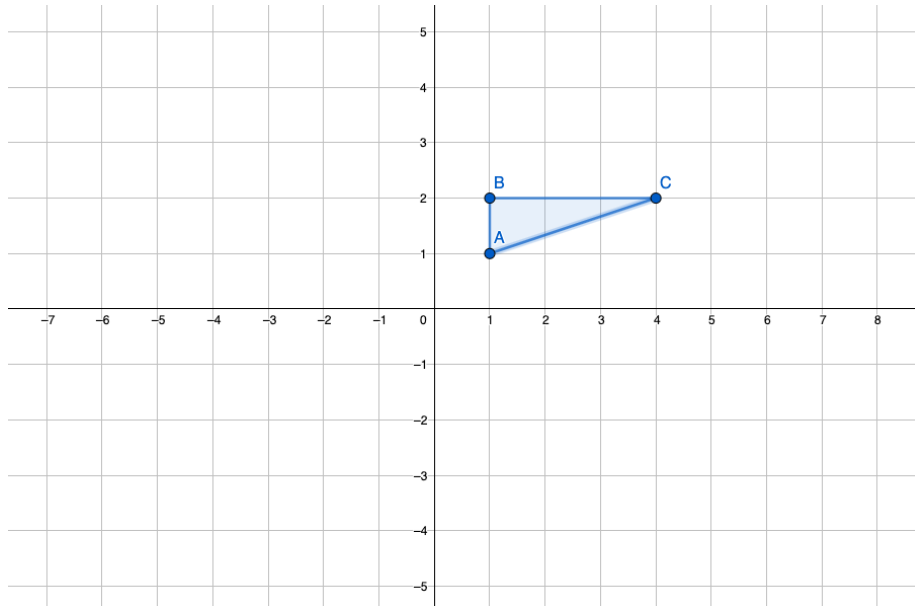
a rotation of 180° clockwise or counterclockwise
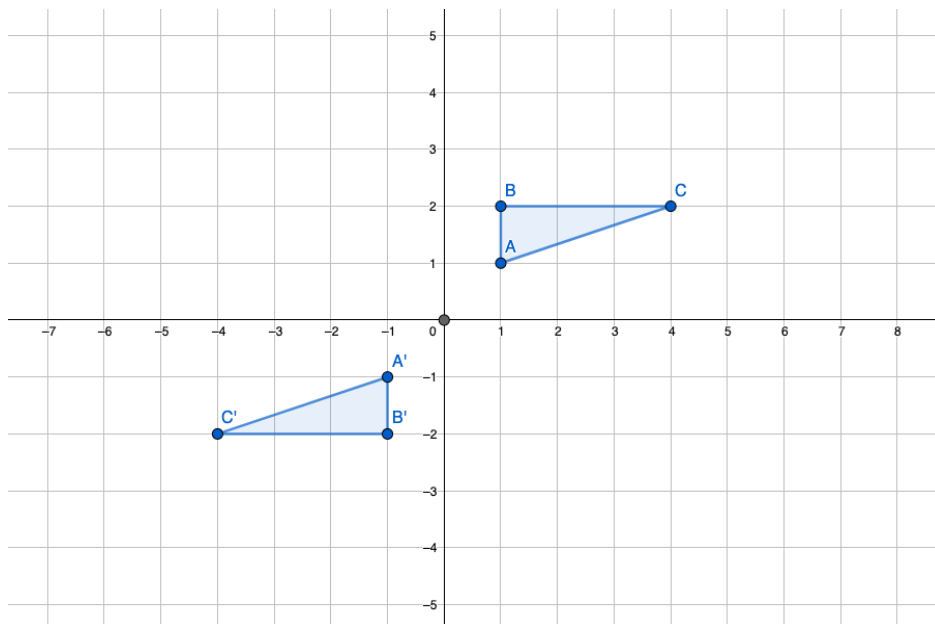
6. Describe the transformation that would take figure ABCDF to figure A'B'C'E'F'.

a rotation of 180° counterclockwise or clockwise using the origin as the center of rotation

Math 7 Plus Unit 4
Rigid Transformations & Congruence
Additional Practice Problems KEY

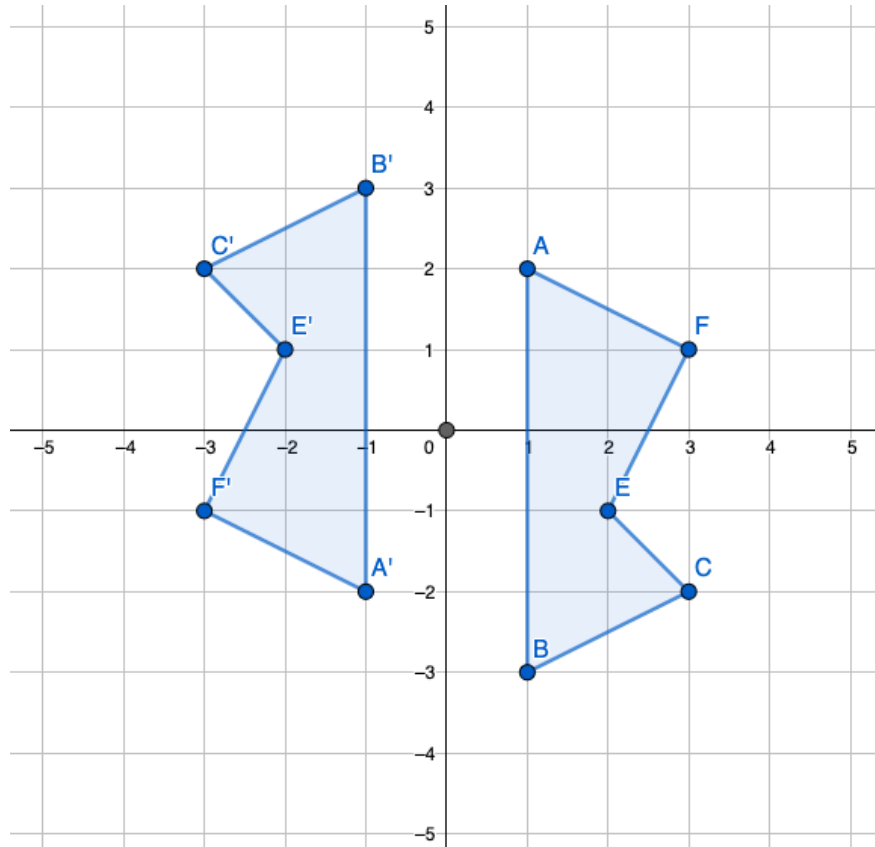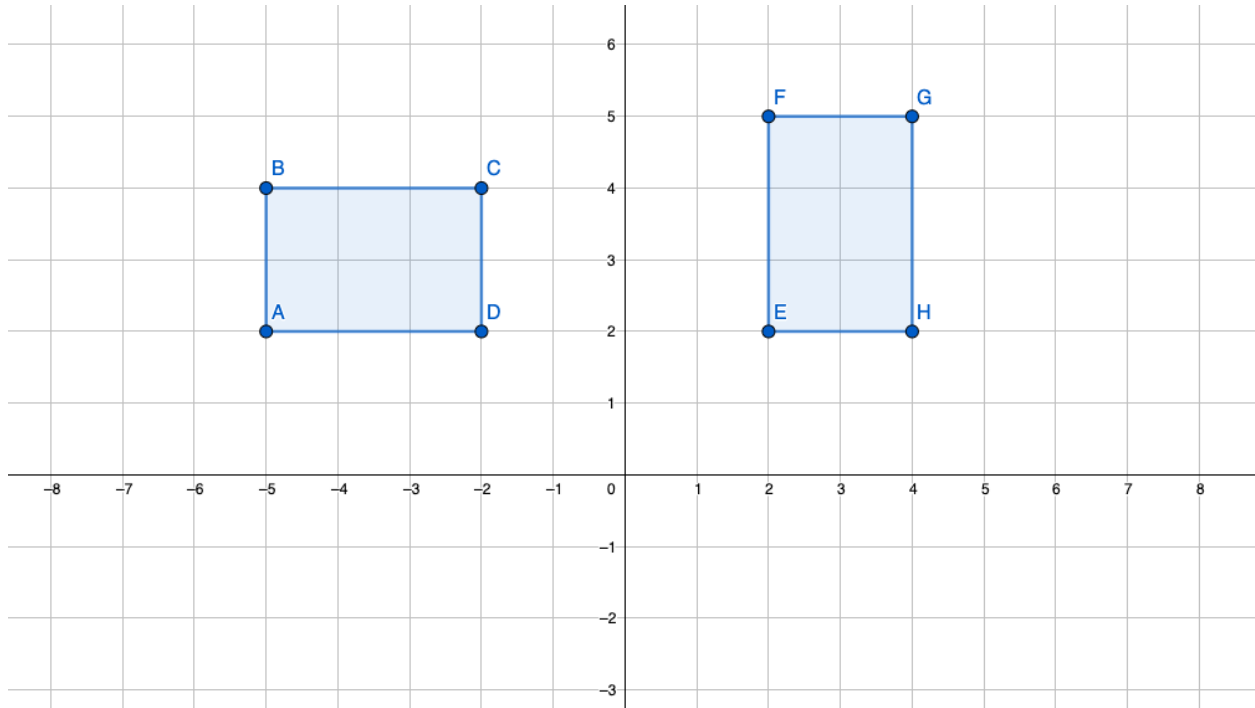Use the diagram below for #7 through #9.

7. Explain why figure EFGH cannot be the reflection of figure ABCD.
    Figure ABCD is a long, wide rectangle. Figure EFGH is a tall, skinny rectangle. Reflections do not change the orientation of the shape. These two figures are not mirror images of one another.

8. Describe a transformation or series of transformations that would take figure ABCD to figure EFGH.
    using the origin as the center of rotation, rotate the figure 90° clockwise

9. Imagine figure ABCD and figure EFGH are two canvases a museum wishes to hang on their wall. Wooden frames are created for each of the shapes. Would the wooden frames be identical? Explain your answer using what you know about the characteristics of rigid transformations.
   Yes, the frames would be identical. Rigid transformations do not change the measurements of a figure.

10. Explain why **any** rigid transformation results in a congruent figure.
    A rigid transformation can slide, turn, or flip a shape. It never changes the angles or lengths of a shape. Therefore, it always produces a congruent figure.

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Math 7 Plus Unit 4
Rigid Transformations & Congruence
Additional Practice Problems KEY

Use the graph below for #11 through #13.
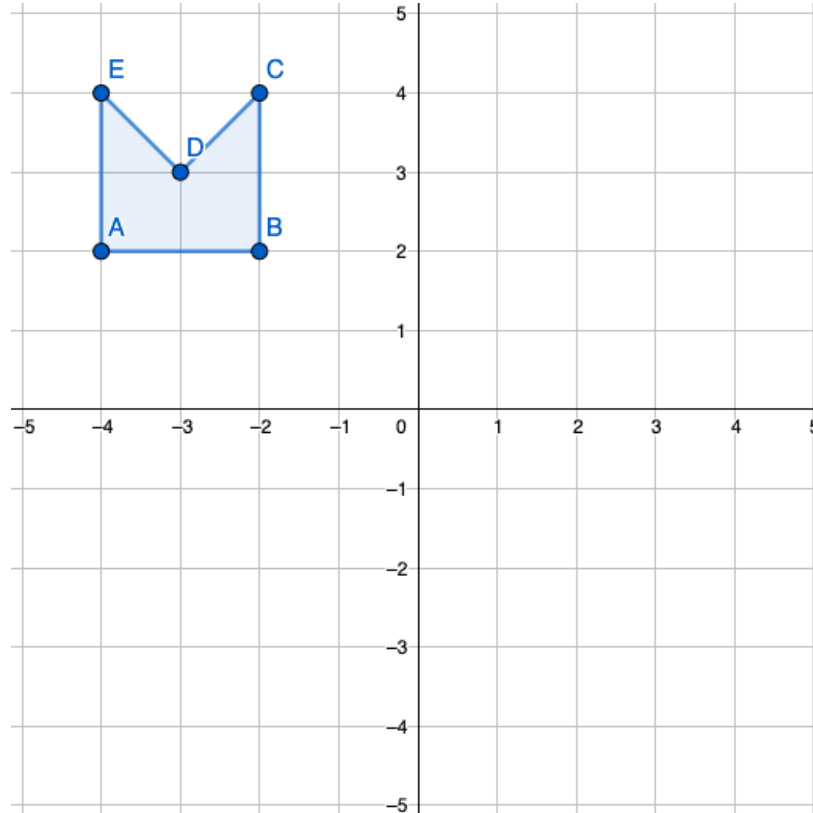
11. What are the coordinates of point D after the figure is reflected over the x-axis?
    a. (-3, -3)
    b. (3, 3)
    c. (3, -3)
    d. (-3, 3)

12. If the measure of angle BCD = 45°, what is the measure of angle B'C'D'?
    a. 90°
    b. 35°
    c. 45°
    d. 55°

13. What transformation would result in A' (0, 0)?
    a. a translation of down 2, right 4
    b. a translation of up 4, right 2
    c. a reflection over the y-axis
    d. a rotation about the origin of 180°

14. Figures FGHJ and RSTU are congruent. The following text box shows facts about the figures.

> length of FG = 4
> length of GH = 7
> length of HJ = 11.5
> length of FJ = 2.5
>
> angle R = 45°
> angle S = 125°
> angle T = 15°
> angle U = 175°

Which statement is **true**?
- a. We do not have enough information to determine the lengths of the sides of Figure RSTU.
- b. We do not have enough information to determine the measures of the angles of Figure FGHJ.
- c. The areas of the two figures are equal.
- d. Both figures are rectangles.

15. Triangle ABD has vertices A (-5, 2), B (-3, 6), and D (-2, 2). After rotating 90° counterclockwise about the origin, what are the coordinates of B'?
- a. (6, 3)
- b. (6, -3)
- c. (-6, -3)
- d. (-3, -6)

Line AB is parallel to line CF. Use the angle diagram below to answer question #6 and #7.
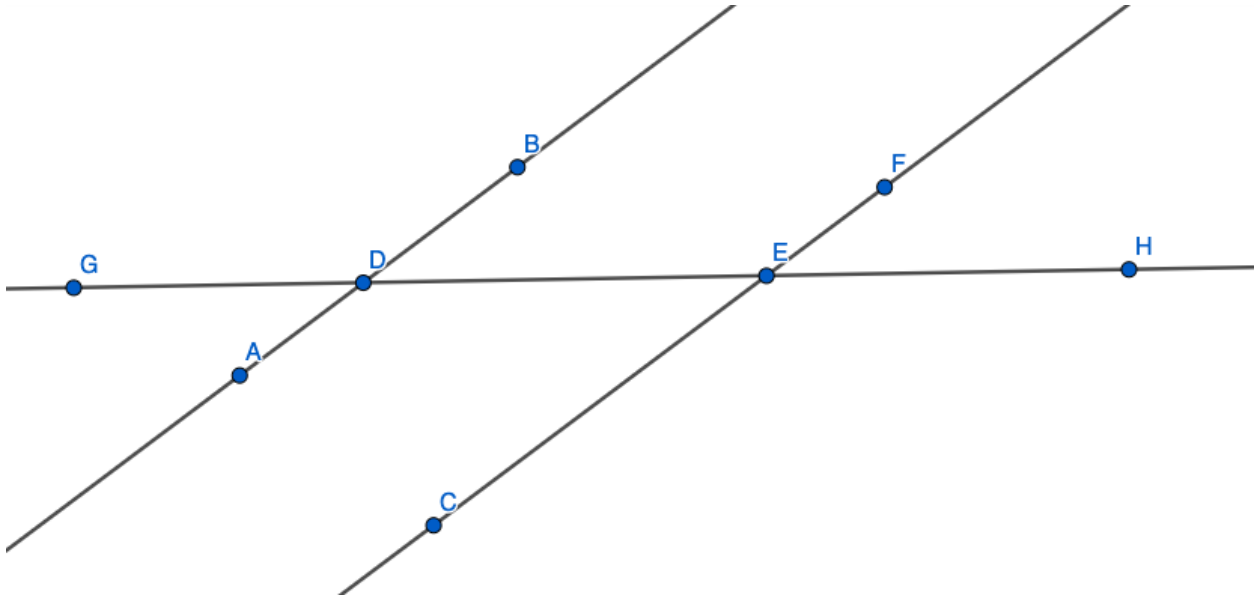

16. Which statement is false?
    a. Angles BDE and DEF are supplementary.
    b. There are four sets of vertical angles shown in the diagram.
    c. The measure of angle ADG is smaller than the measure of angle CED.
    d. The sum of angles BDG, ADG, ADE, and BDE is 360°.

17. If the measure of angle ADG is 42°, what is the measure of the sum of angles CED and BDE?
    a. 42°
    b. 138°
    c. 180°
    d. 84°

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18. Find the measure of angle x.
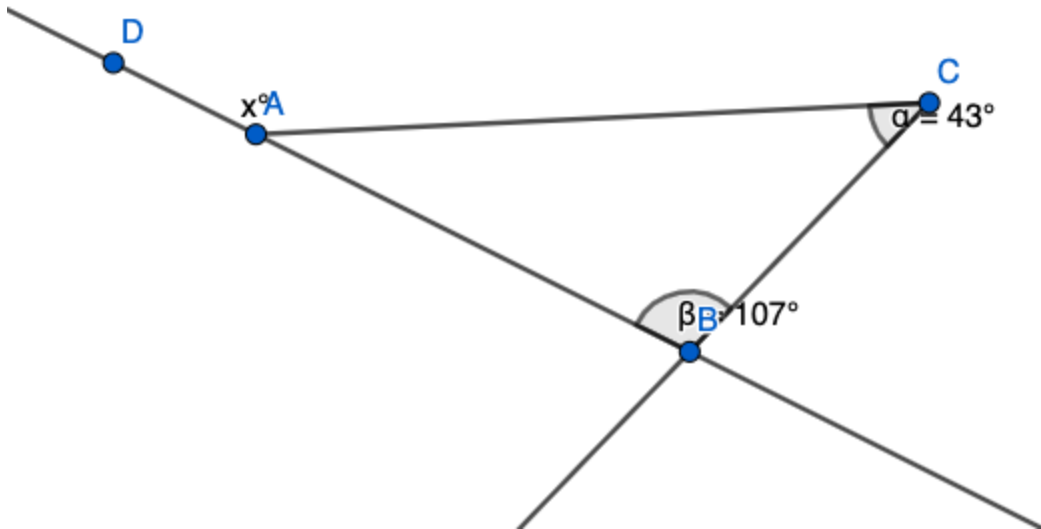
D

x°A

C

α = 43°

βB 107°

a. 30°
b. 150°
c. 157°
d. 143°

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19. Which transformation takes figure ABCE to figure A'B'C'E'?
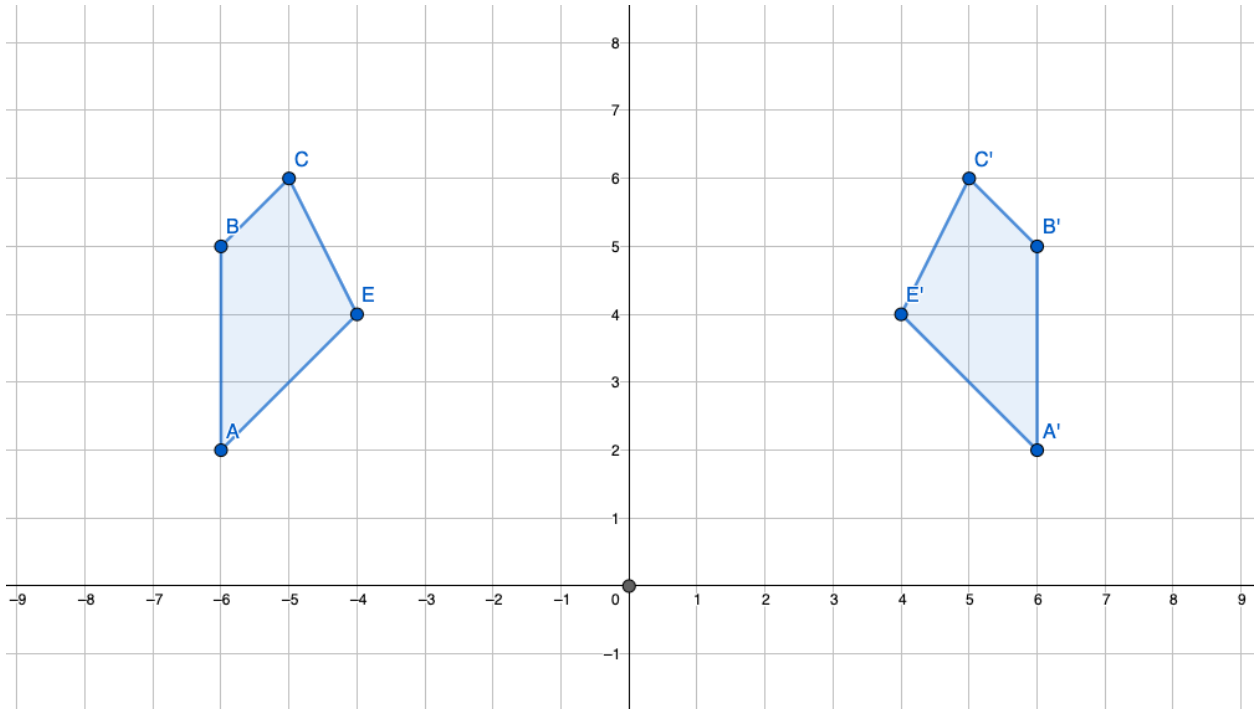
    a. a translation of left 10
    b. a rotation of 90° clockwise about the origin
    c. a reflection over the y-axis
    d. a rotation of 90° counterclockwise about the origin

20. Figure WEST is to be translated up 3 and right 5. Explain how this translation will affect the x- and y-coordinates of the new shape.
    a. add 3 to each x-coordinate and add 5 to each y-coordinate
    b. add 5 to each x-coordinate and add 3 to each y-coordinate
    c. subtract 3 from each x-coordinate and subtract 5 from each y-coordinate
    d. subtract 5 from each x-coordinate and subtract 3 from each y-coordinate

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