

Bellwork

02/23/2012

1. Subtract.

$$\begin{bmatrix} 8 & -2 \\ -3 & 5 \end{bmatrix} + \begin{bmatrix} -4 & -3 \\ -1 & +7 \end{bmatrix} = \begin{bmatrix} 4 & -5 \\ -4 & 12 \end{bmatrix}$$

2. Multiply.

$$\begin{bmatrix} 2 & -5 \\ 1 & 0 \end{bmatrix} \begin{bmatrix} 6 & -1 \\ 3 & -2 \end{bmatrix}$$

$$\begin{array}{l} 2(6) + -5(3) \\ 12 + -15 \end{array}$$

$$\begin{array}{l} 2(-1) + -5(-2) \\ -2 + +10 \end{array}$$

$$\begin{array}{l} 1(6) + 0(3) \\ 6 + 0 \end{array}$$

$$\begin{array}{l} 1(-1) + 0(-2) \\ -1 + 0 \end{array}$$

$$\begin{bmatrix} -3 & 8 \\ 6 & -1 \end{bmatrix}$$

Geometry

9.3 Perform Reflections

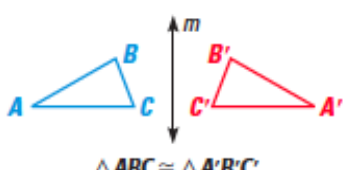
Standard(s): 3

Vocabulary:

Line of Reflection: When a transformation uses a line like a mirror to reflect an image.

THEOREM
For Your Notebook

THEOREM 9.2 Reflection Theorem
 A reflection is an isometry.



Proof: Exs. 35–38, p. 595

$\triangle ABC \cong \triangle A'B'C'$

KEY CONCEPT
For Your Notebook

Coordinate Rules for Reflections

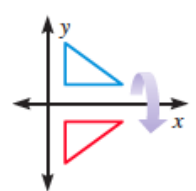
- If (a, b) is reflected in the x-axis, its image is the point $(a, -b)$.
- If (a, b) is reflected in the y-axis, its image is the point $(-a, b)$.
- If (a, b) is reflected in the line $y = x$, its image is the point (b, a) .
- If (a, b) is reflected in the line $y = -x$, its image is the point $(-b, -a)$.

Handwritten notes: $(a, -3)$ and $(2, 3)$ above the first two points.

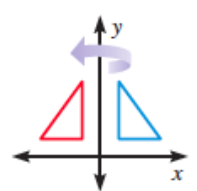
KEY CONCEPT
For Your Notebook

Reflection Matrices

Reflection in the x-axis

$$\begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$$


Reflection in the y-axis

$$\begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix}$$


Handwritten note: Multiply by your polygon matrix

Graph Reflection in Horizontal and Vertical Lines

Graph a reflection of $\triangle ABC$ with vertices $A(1,3)$, $B(5,2)$, and $C(2,1)$. Graph the reflection described.

$$y=4$$

$$y=x$$

$$A'(3, 1)$$

$$B'(2, 5)$$

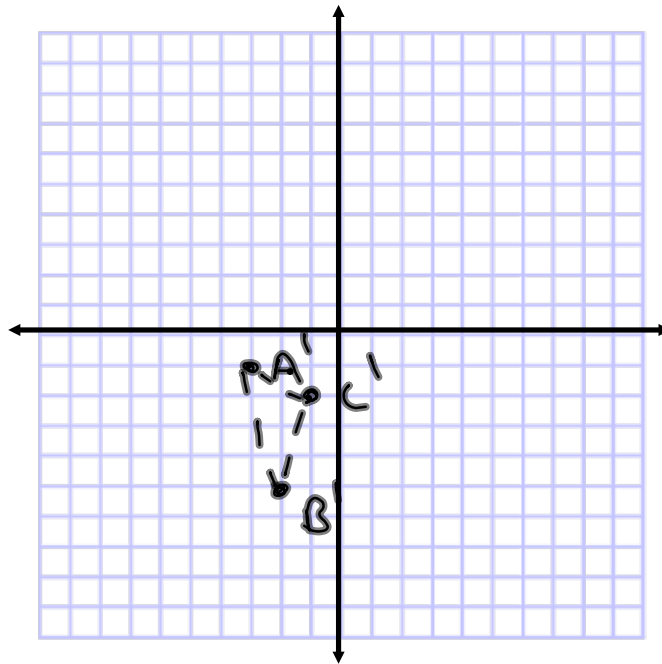
$$C'(1, 2)$$

$$y=-x$$

$$A'(-3, -1)$$

$$B'(-2, -5)$$

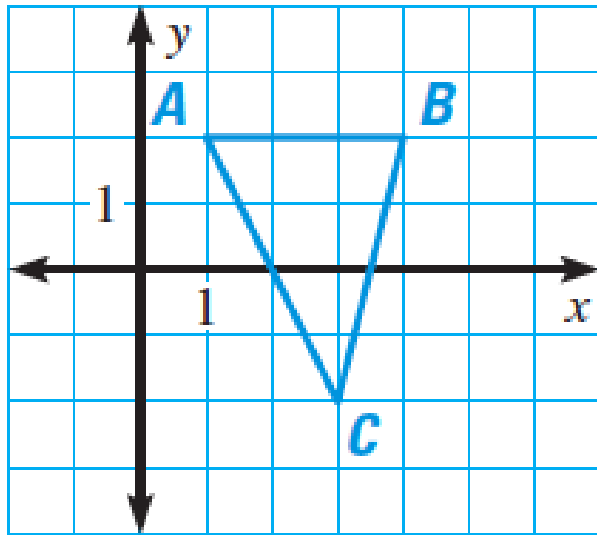
$$C'(-1, -2)$$



Finding Image Matrices

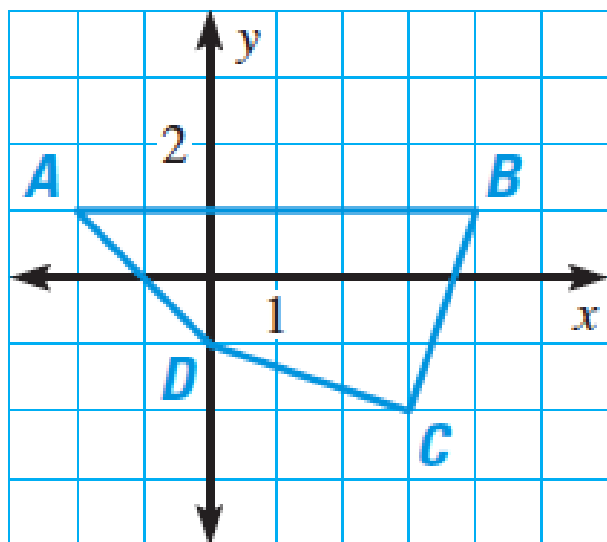
Write a matrix for the polygon. Then find the image matrix that represents the polygon after a reflection in the given line.

y-axis



$$\begin{array}{ccc} A & B & C \\ \left[\begin{array}{ccc} 1 & 4 & 3 \\ 2 & 2 & -2 \end{array} \right] \\ \\ A' & B' & C' \\ \left[\begin{array}{ccc} -1 & -4 & -3 \\ 2 & 2 & -2 \end{array} \right] \end{array}$$

x-axis

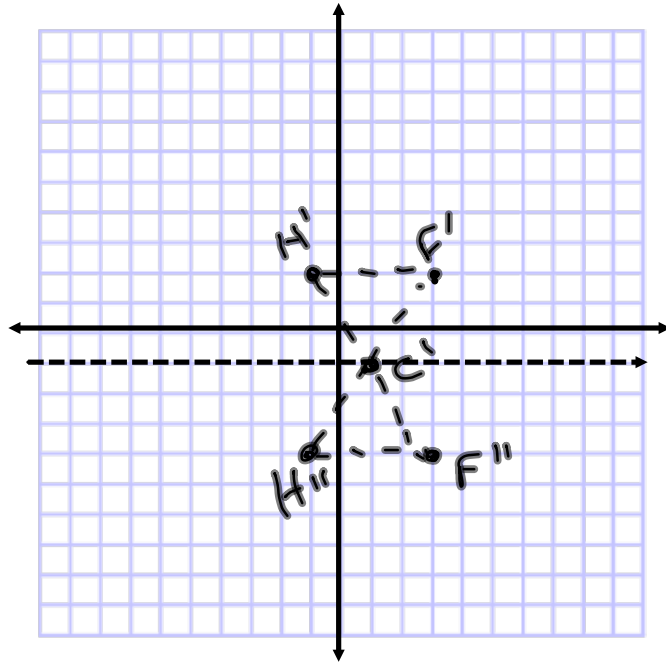


$$\begin{array}{cccc} A & B & C & D \\ \left[\begin{array}{cccc} -2 & 4 & 3 & 0 \\ 1 & 1 & -2 & -1 \end{array} \right] \\ \\ A' & B' & C' & D' \\ \left[\begin{array}{cccc} -2 & 4 & 3 & 0 \\ -1 & -1 & 2 & 1 \end{array} \right] \end{array}$$

Two Reflections

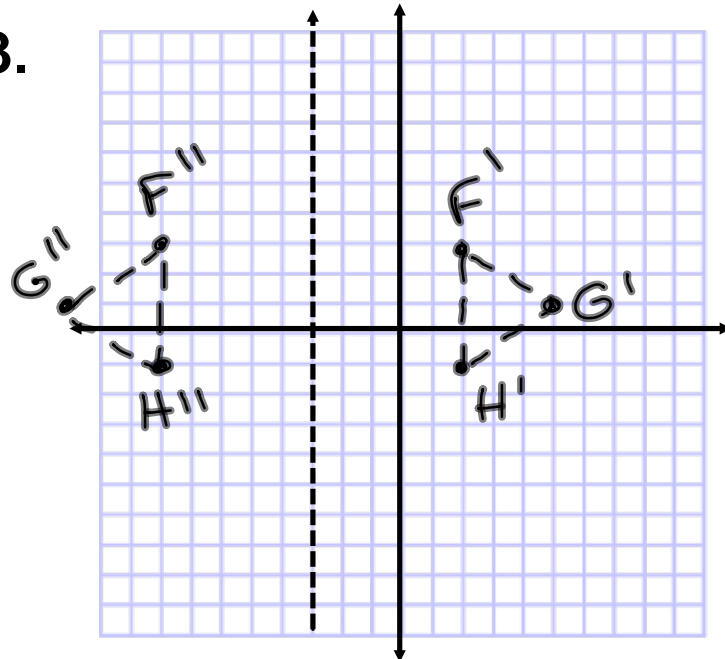
The vertices of $\triangle FGH$ are $F(3,2)$, $G(1,5)$, and $H(-1,2)$. Reflect $\triangle FGH$ in the first line. Then reflect $\triangle F'G'H'$ in the second line. Graph $\triangle F''G''H''$ and $\triangle F'G'H'$.

In $y=2$, then $y=-1$.



In $y=x$, then $x=-3$.

$F'(2,3)$
 $G'(5,1)$
 $H'(2,-1)$



Homework Assignment

Worksheet 9.3B

