

Geometry CP  
Translations, Reflections, and Rotations

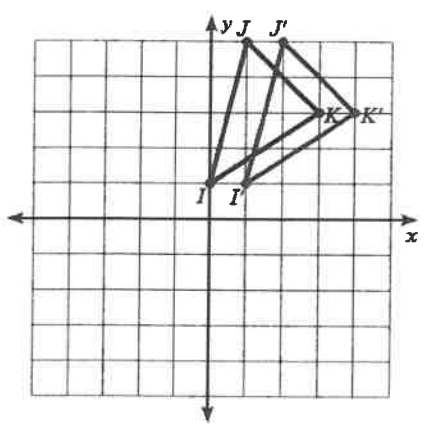
Preimage → the original figure

Image → the new transformed figure *denote image w/ apostrophe*  $A \rightarrow A'$

Transformation → the operation that moves, the preimage onto the image

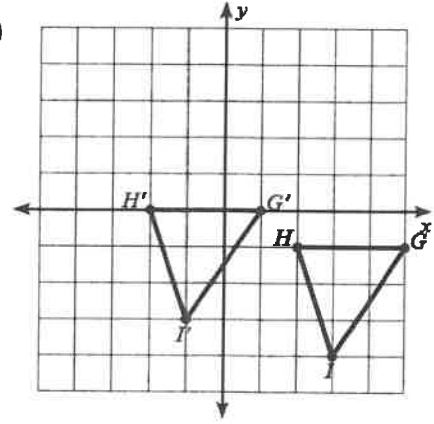
**Translations:** shifts left, right, up, or down

Identify the Translation:



$I(0,1) \rightarrow I'(1,1)$

right 1 down 0



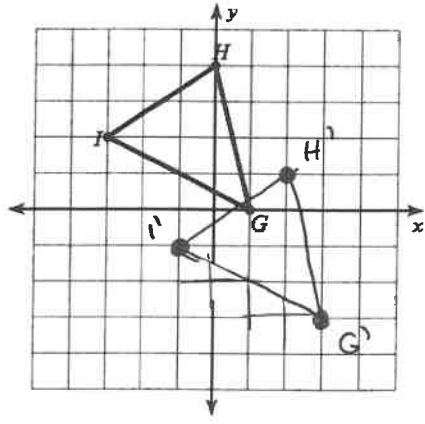
$H(2,-1) \rightarrow H'(-2,0)$

left 4 up 1

Rule  $(x, y) \rightarrow (x+1, y)$   
original pt → transformed point

$(x, y) \rightarrow (x-4, y+1)$

Draw the image of the HIJ translated three units down and two units right.



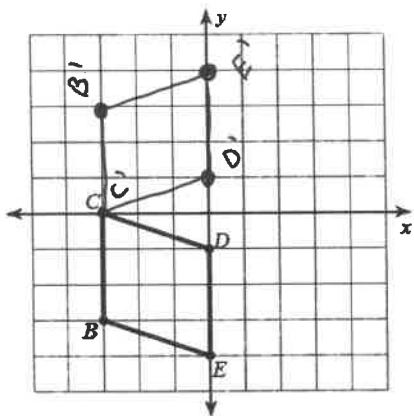
$(x, y) \rightarrow (x+2, y-3)$

Method 1:  
move points  
on graph

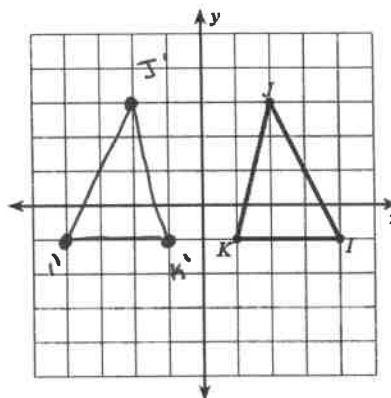
Method 2:  $(0+2, 4-3)$   
 $H(0,4) \rightarrow H'(2,1)$   
 $I(-3,2) \rightarrow I'(-1,-1)$   
 $G(1,0) \rightarrow G'(3,-3)$

**Reflection:** reflected over a line creating a mirror image.

Draw the image BCDE reflected across the x-axis



Draw the image of JKI reflected across the y-axis



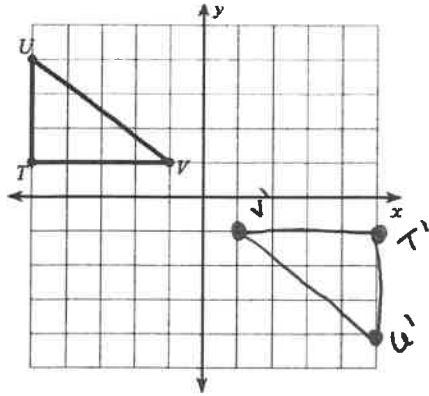
- Reflection in x-axis:  $(x, y) \rightarrow (x, -y)$
- Reflection in y-axis:  $(x, y) \rightarrow (-x, y)$
- Reflection in  $y = x$ :  $(x, y) \rightarrow (y, x)$
- Reflection in  $y = -x$ :  $(x, y) \rightarrow (-y, -x)$
- For other vertical or horizontal lines, easiest way is to count boxes or fold paper!!

**Rotation:** turned about a fixed point a given number of degrees.

Rotation of $90^\circ$ counter-clockwise about the origin	$(x, y) \rightarrow (-y, x)$
Rotation of $180^\circ$ about the origin	$(x, y) \rightarrow (-x, -y)$
Rotation of $270^\circ$ counter-clockwise about the origin	$(x, y) \rightarrow (y, -x)$

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Rotate the image 180° about the origin



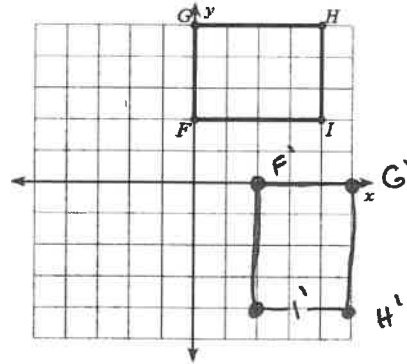
$$U (-5, 4) \rightarrow U' (5, -4)$$

$$T (-5, 1) \rightarrow T' (5, -1)$$

$$V (-1, 1) \rightarrow V' (1, -1)$$

$$(x, y) \rightarrow (-x, -y)$$

Rotate the image 270° about the origin  
*counter clockwise*



$$H (4, 5) \rightarrow H' (5, -4)$$

$$G (0, 5) \rightarrow G' (5, 0)$$

$$I (4, 2) \rightarrow I' (2, -4)$$

$$F (0, 2) \rightarrow F' (2, 0)$$

$$(x, y) \rightarrow (y, -x)$$

90° clockwise = 270° counter clockwise

