

Geometry

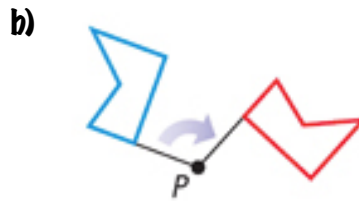
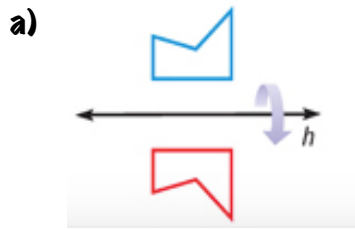
Notes Section 4.9

Perform Congruence Transformations

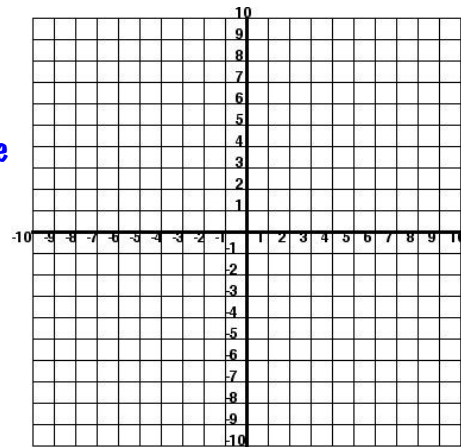
VOCABULARY

- Transformation:** an operation that moves or changes a geometric figure: translation, rotation or reflection.
- Image:** resulting figure after a transformation
- Translation:** moves every point of a figure the same distance in the same direction.
- Reflection:** uses a line of reflection to create a mirror image of the original figure.
- Rotation:** turns a figure about a fixed point.
- Center of Rotation:** fixed point
- Congruence Transformation:** changes the position of the figure without changing its size or shape.
- Coordinate Notation:** $(x,y) \rightarrow (x + \#, y + \#)$
- Reflection Across the X-axis:** $(x,y) \rightarrow (x, -y)$
- Reflection Across the Y-axis:** $(x,y) \rightarrow (-x, y)$
- Angle of Rotation:** formed by 2 rays drawn from the center of rotation: clockwise or counter-clockwise

EXAMPLE 1 Name the type of transformation.



EXAMPLE 2 Figure ABCD has the vertices $A(-4,3)$, $B(-2,4)$, $C(-1,1)$ & $D(-3,1)$. Sketch ABCD and its image after the translation $(x,y) \rightarrow (x+5,y-2)$.



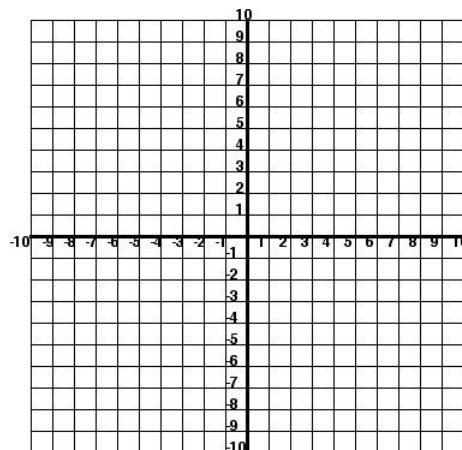
$A(-4,3) \rightarrow$ _____

$B(-2,4) \rightarrow$ _____

$C(-1,1) \rightarrow$ _____

$D(-3,1) \rightarrow$ _____

EXAMPLE 3 You are drawing a pattern. Use a reflection across the x-axis to complete the other half of the pattern.



$(x,y) \rightarrow$ _____

$(-1,0) \rightarrow$ _____

$(-1,2) \rightarrow$ _____

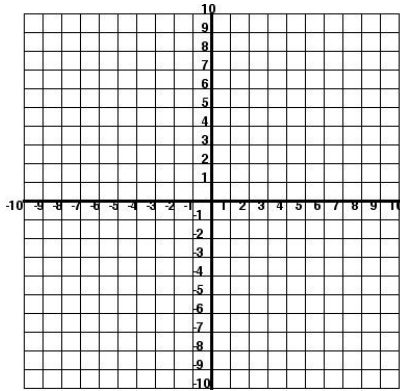
$(1,2) \rightarrow$ _____

$(1,4) \rightarrow$ _____

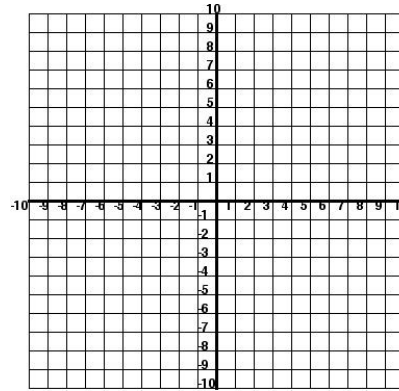
$(5,0) \rightarrow$ _____

EXAMPLE 4 Graph AB and CD . Tell whether CD is a rotation of AB about the origin. If so, give the angle and direction of rotation.

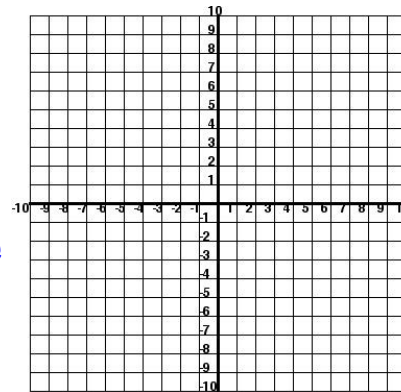
a) $A(-3,1)$, $B(-1,3)$, $C(1,3)$ & $D(3,1)$



b) $A(0,1)$, $B(1,3)$, $C(-1,1)$ & $D(-3,2)$



EXAMPLE 5 The vertices of $\triangle ABC$ are $A(4,4)$, $B(6,6)$ and $C(7,4)$. The notation $(x,y) \rightarrow (x+1,y-3)$ describe the translation of $\triangle ABC$ to $\triangle DEF$. Show that $\triangle ABC \cong \triangle DEF$ to verify that the translation is a congruence transformation.



STEP 1 Show a set of \cong sides _____

STEP 2 Show a 2nd set of \cong sides (Distance Formula)

STEP 3 Find the SLOPES of the sides that form $\angle A$ & $\angle B$.

