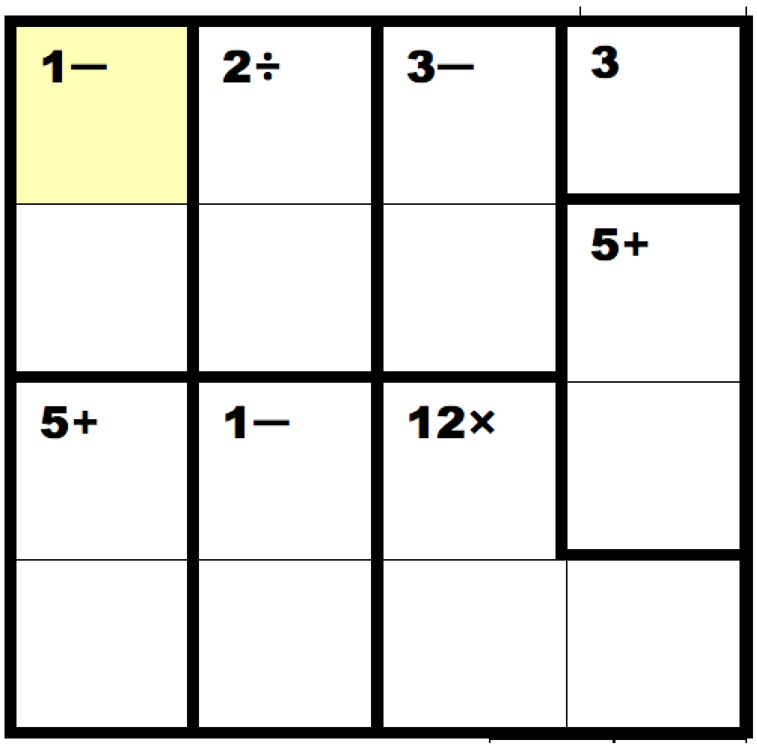
Created by Mr. Lischwe

Warmup 1/ $\left(8^{5}\cdot 8^{-4}\right)+\left(\frac{3^{10}}{3^{8}}\right)$

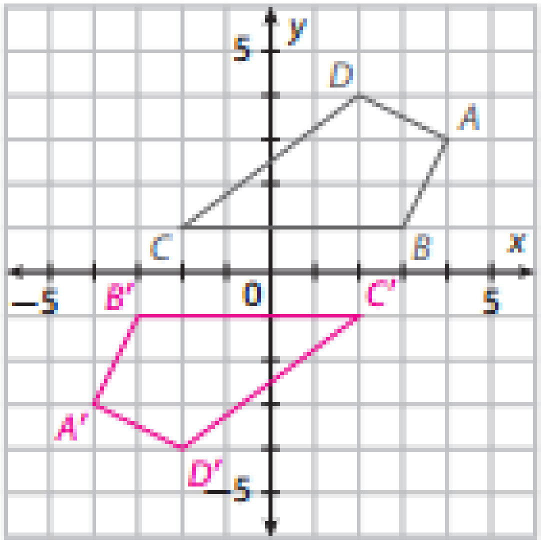
****Don't forget to do the reflection!!!****



******Please get:

- Graphing Sheet
- Marker & Eraser
- 1 sheet of tracing paper (on the supply table)

1. $(x, y) \to (-x, -y)$



$A(4, 3) \to A'(-4, -3) = A'(-4, -3)$

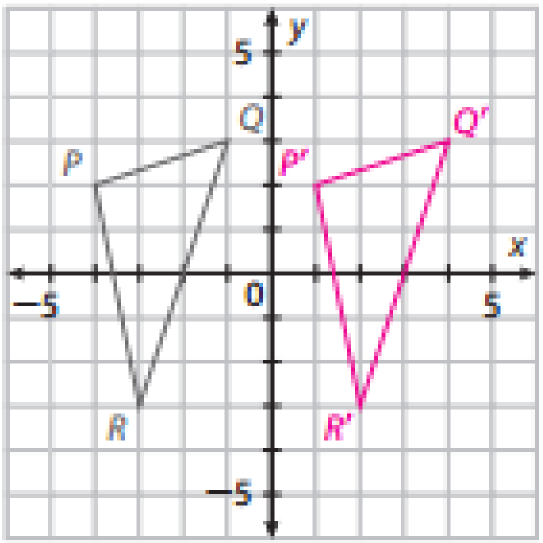
$B(3, 1) \to B'(-3, -1) = B'(-3, -1)$

$C(-2, 1) \to C'\big(-(-2), -1\big) = C'(2, -1)$

$D(2, 4) \to D'(-2, -4) = D'(-2, -4)$

rotation of 180° around the origin

2. $(x, y) \to (x + 5, y)$



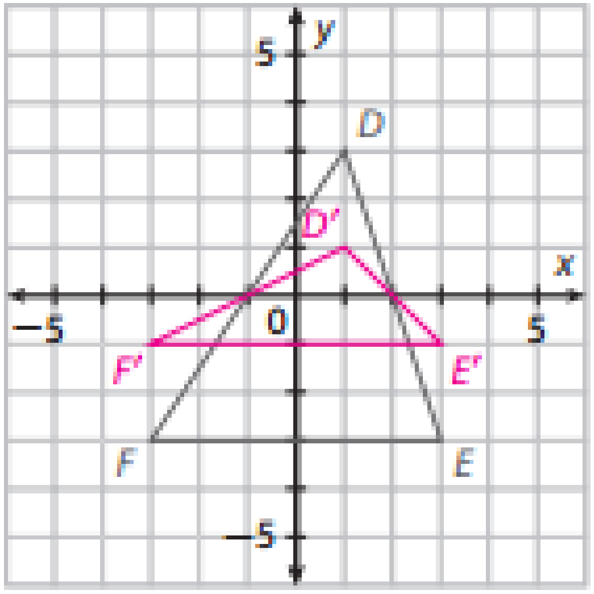
$P(-4, 2) \to P'(-4 + 5, 2) = P'(1, 2)$

$Q(-1, 3) \to Q'(-1 + 5, 3) = Q'(4, 3)$

$R(-3, -3) \to R'(-3 + 5, -3) = R'(2, -3)$

translation 5 units right

3. $(x, y) \rightarrow \left(x, \frac{1}{3}y\right)$



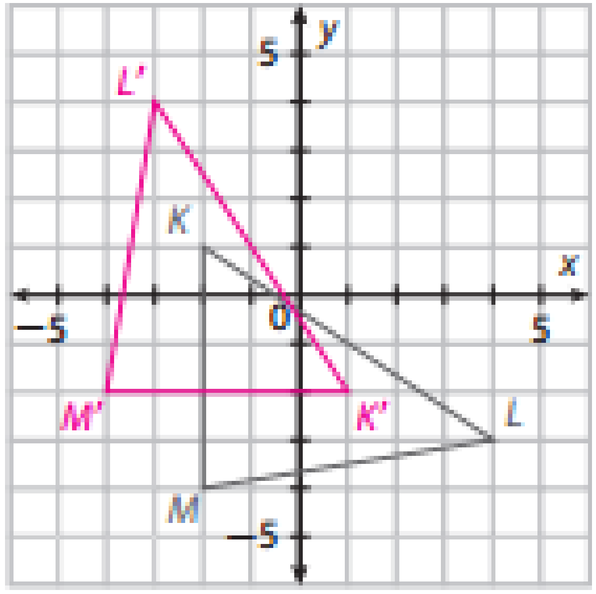
$D(1, 3) \rightarrow D'\left(1, \frac{1}{3} \cdot 3\right) = D'(1, 1)$

$E(3, -3) \rightarrow E'\left(3, \frac{1}{3} \cdot -3\right) = E'(3, -1)$

$F(-3, -3) \rightarrow F'\left(-3, \frac{1}{3} \cdot -3\right) = F'(-3, -1)$

vertical compression by a factor of $\frac{1}{3}$

4. $(x, y) \rightarrow (y, x)$



$K(-2, 1) \rightarrow K'(1, -2)$

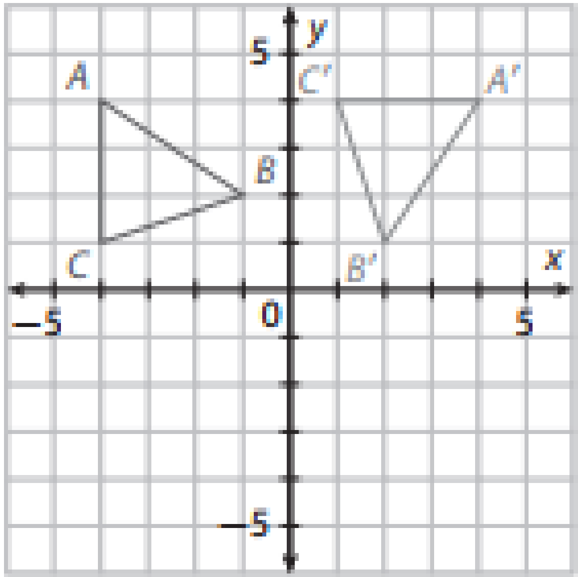
$L(4, -3) \rightarrow L'(-3, 4)$

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

reflection across the line $y = x$

5. **Preimage** **Image**

$A(-4, 4) \rightarrow A'(4, 4)$
$B(-1, 2) \rightarrow B'(2, 1)$
$C(-4, 1) \rightarrow C'(1, 4)$



$(x, y) \rightarrow (y, -x)$; rotation of 90° clockwise around the origin

$AB = A'B' = \sqrt{13}$ $\quad$ $m\angle A = m\angle A' = 56°$

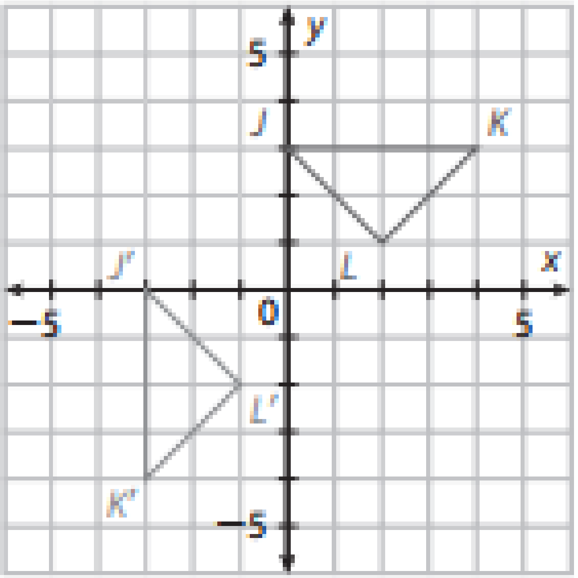
$BC = B'C' = \sqrt{10}$ $\quad$ $m\angle B = m\angle B' = 52°$

$AC = A'C' = 3$ $\quad$ $m\angle C = m\angle C' = 72°$

The transformation preserves length and angle measure.

6. **Preimage** **Image**

$J(0, 3) \rightarrow J'(-3, 0)$
$K(4, 3) \rightarrow K'(-3, -4)$
$L(2, 1) \rightarrow L'(-1, -2)$



$(x, y) \rightarrow (-y, -x)$; reflection across the line $y = -x$

$JK = J'K' = 4$ $\quad$ $m\angle J = m\angle J' = 45°$

$KL = K'L' = \sqrt{8}$ $\quad$ $m\angle K = m\angle K' = 45°$

$JL = J'L' = \sqrt{8}$ $\quad$ $m\angle L = m\angle L' = 90°$

The transformation preserves length and angle measure.

10. Use the points $A(2, 3)$ and $B(2, -3)$.

a. Describe segment AB and find its length.

Segment AB is a vertical segment that is 6 units long.

b. Describe the image of segment AB under the transformation $(x, y) \rightarrow (x, 2y)$.

$A(2, 3) \rightarrow A'(2, 2 \cdot 3) = A'(2, 6)$

$B(2, -3) \rightarrow B'(2, 2 \cdot (-3)) = B'(2, -6)$

The image of segment AB is a vertical segment that is 12 units long.

c. Describe the image of segment AB under the transformation $(x, y) \rightarrow (x + 2, y)$.

$A(2, 3) \rightarrow A'(2 + 2, 3) = A'(4, 3)$

$B(2, -3) \rightarrow B'(2 + 2, -3) = B'(4, -3)$

The image of segment AB is a vertical segment two units to the right of the original segment that is 6 units long.

d. Compare the two transformations.

Possible answer: $(x, y) \rightarrow (x + 2, y)$ is rigid, because it does not change the length of the segment. $(x, y) \rightarrow (x, 2y)$ is not rigid because it doubles the length of the segment. The segment remains vertical under both transformations.

Return of the Quizzes

Objective

Identify and draw translations.

WHAT IS A TRANSLATION?

What kind of Translation is this?

$(x, y) \rightarrow (x + 5 , y)$ 5 units right

$(x, y) \rightarrow (x - 3 , y)$ 3 units left

$(x, y) \rightarrow (x , y + 2)$ 2 units up

$(x, y) \rightarrow (x , y - 4)$ 4 units down

$(x, y) \rightarrow (x - 6, y + 8)$ 6 units left, 8 units up

Patty Paper Time!

- Draw a triangle that is smaller than a fourth of the size of the patty paper on your blank piece of paper. Label the vertices of the triangle.
- Copy the triangle onto the patty paper.
- Using your patty paper, translate your triangle to somewhere else on your paper. Label your new points with prime marks.

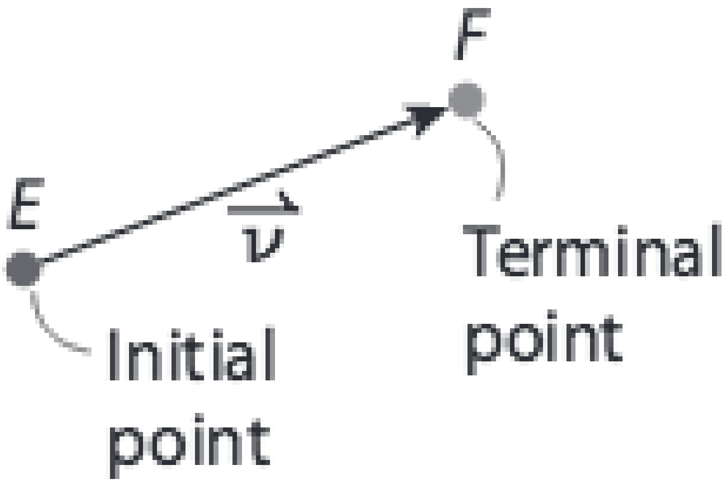
Patty Paper Time!

- Using your ruler, connect the preimage vertices to the image vertices.
- Measure each of these segments.
- What do you notice?
- Are these segments parallel, perpendicular, or neither?

These segments are… pg. 834

Vectors!

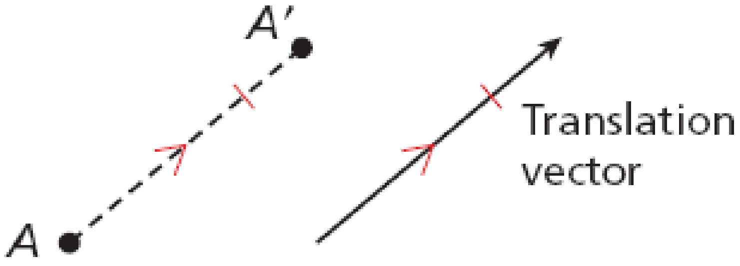
- A quantity that has both direction and magnitude.
- The initial point of a vector is the starting point.
- The terminal point is the ending point.

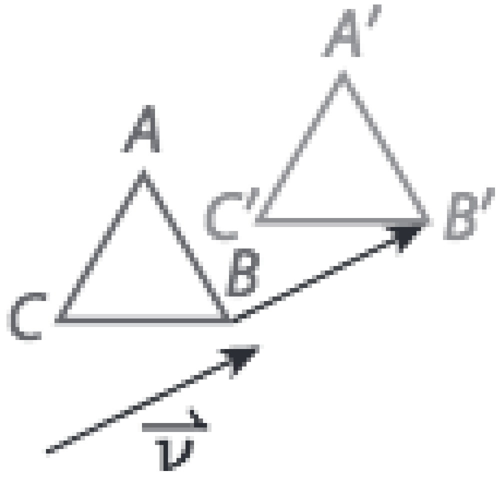


named $\overrightarrow{EF}$ or $\vec{v}$.

Translations

A translation is a transformation along a vector such that each segment joining a point and its image has the same length as the vector and is parallel to the vector.





Vector Video

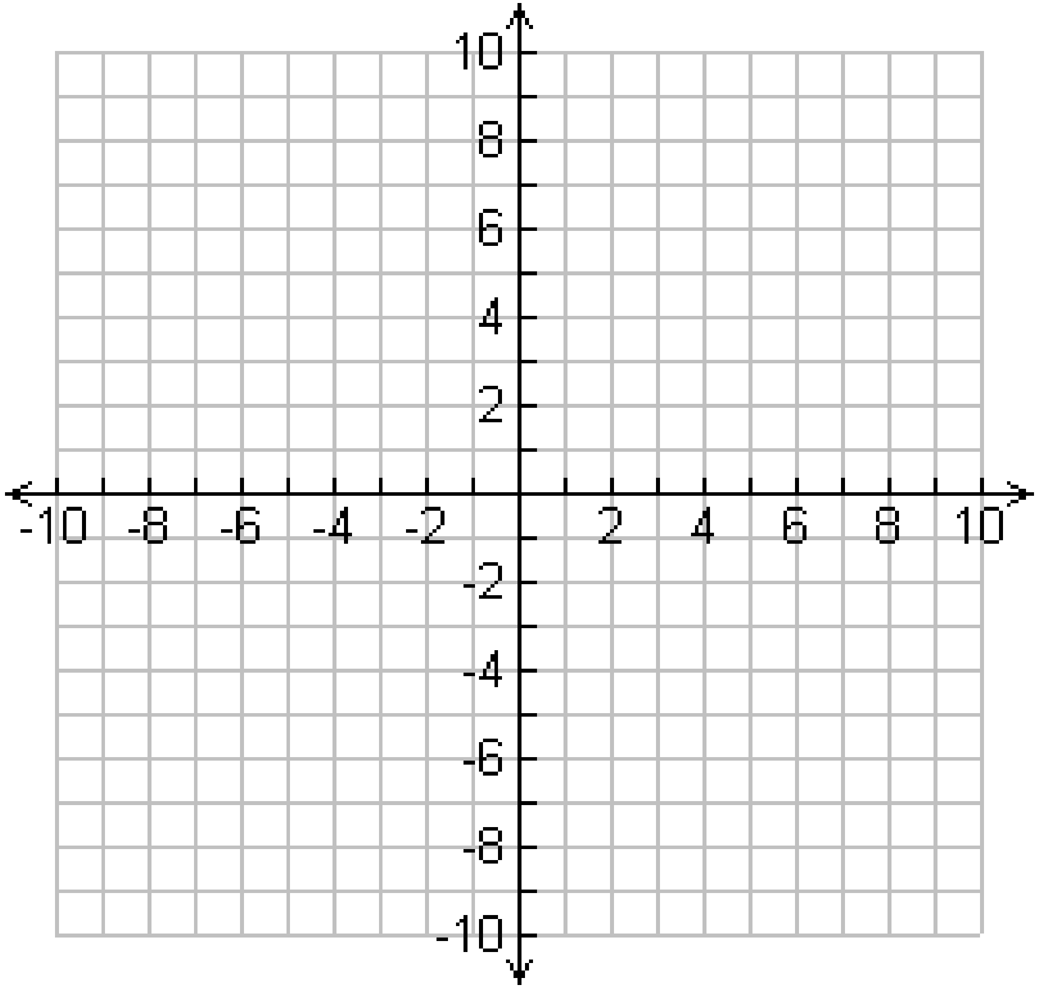
- https://www.youtube.com/watch?v=A05n32Bl0aY

A vector in the coordinate plane can be written as $\langle a, b \rangle$, where *a* is the horizontal change and *b* is the vertical change from the initial point to the terminal point.

How does this connect to the Pythagorean Theorem?

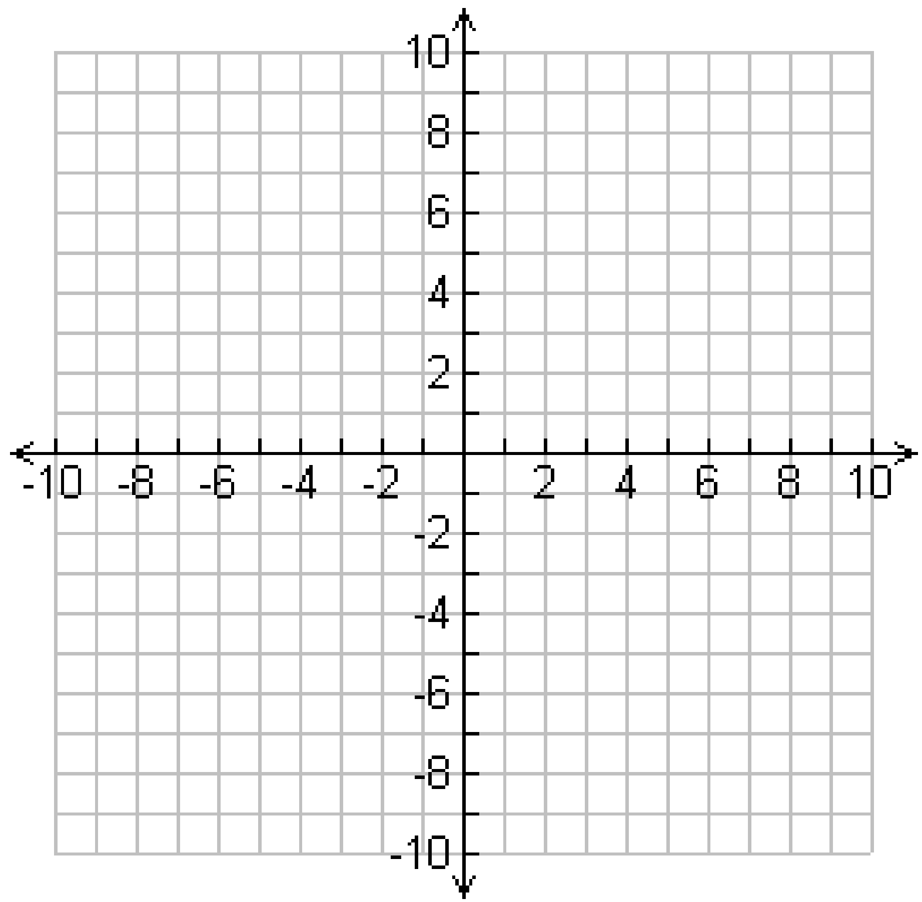
Try It Out!

- Draw a Triangle with coordinates T (5, 5) R (5, 7) and Y (8, 5)
- Use the Vector $< -6, -6 >$ to translate the triangle



Try It Out!

- Draw a Triangle with coordinates B (1, 1) O (3, 2) and L (5, 1)
- Use the Vector $< 3, -4 >$ to translate the triangle



What would the vector be?

$(x, y) \rightarrow (x + 5, y)$ $\quad < 5, 0 >$

$(x, y) \rightarrow (x - 3, y)$ $\quad < -3, 0 >$

$(x, y) \rightarrow (x, y + 2)$ $\quad < 0, 2 >$

$(x, y) \rightarrow (x, y - 4)$ $\quad < 0, -4 >$

$(x, y) \rightarrow (x - 6, y + 8)$ $\quad < -6, 8 >$

HOMEWORK

pg. 839 (1-10)