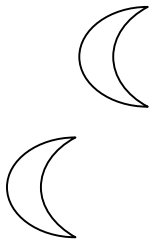
Pre Algebra Name
Translations

1. Translations are defined as a **slide** in the coordinate plane.



2. Slides can be **up**, **down**, **left** or **right**.

3. Can be one move in one direction, two moves in a combination of directions.

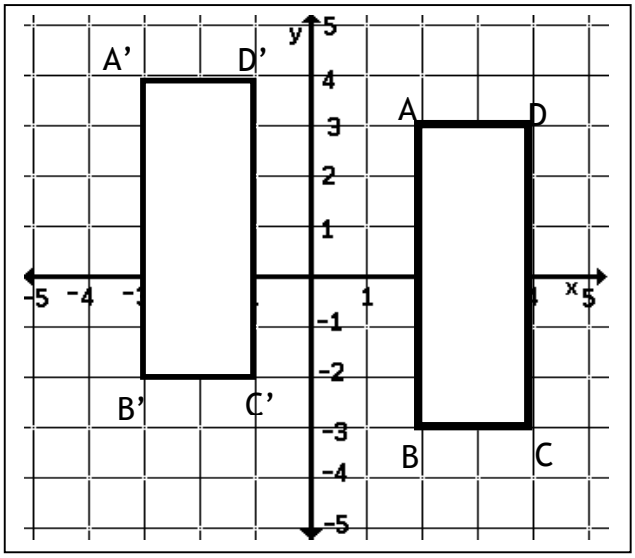
4. Size of shape does NOT change. Position in coordinate plane does.

5. Algebraic representation :

$$(x , y) \rightarrow (x + \mathbf{a}, y + \mathbf{b})$$

- where **a** and **b** are the changes in position.
- "a" will move the shape right (positive) or left (negative).
- "b" will move the shape up (positive) or down (negative).

EX:



STEPS TO SOLVE

The original figure is A, B, C, D and the new figure is A', B', C', D'.

1) Take one point, for example: A= (2,3) and it moved to A'= (-3,4)

2) So, the x-coordinate changed from 2 to -3 or 5 units to the left (negative).

$$(x + a)= (x + (-5))= (x - 5)$$ (NO DOUBLE NEGATIVE)

3) Now, look back at the point and focus on the y-coordinate.
It changed from 3 to 4 or one unit up (positive).

$$(y + b)= (y + (1))= (y + 1)$$

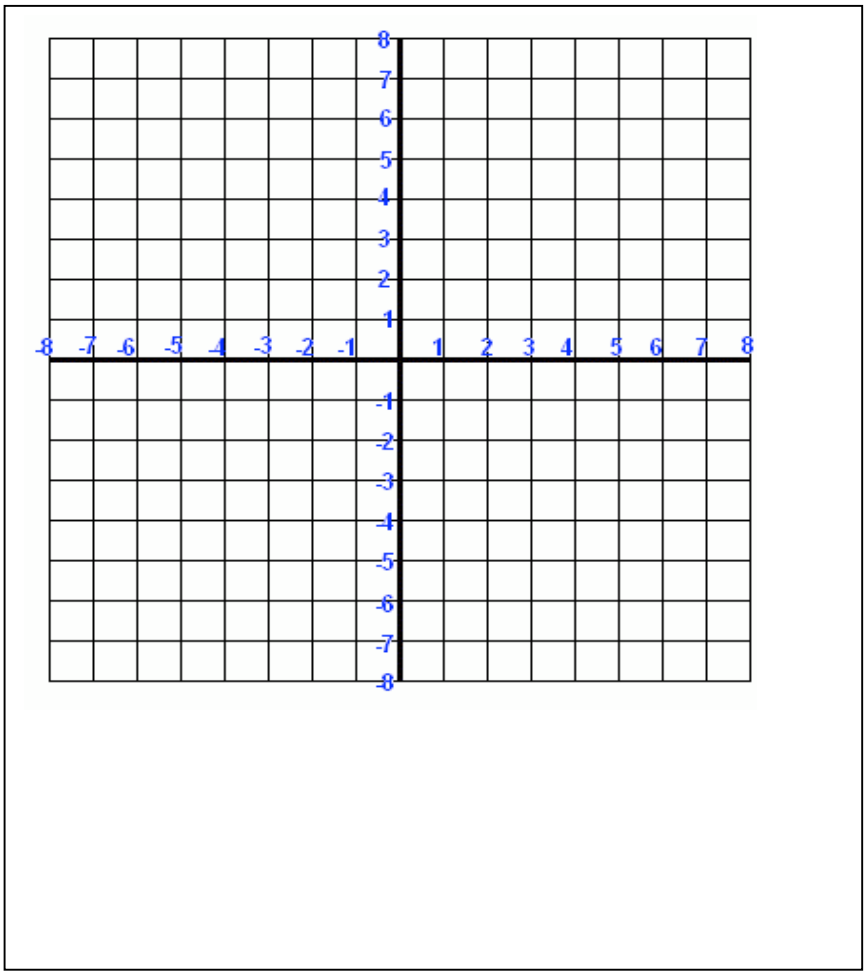
4) So, the transformation will be in the form:

$$(x , y) \longrightarrow (x + a, y + b) \longrightarrow (x - 5, y + 1)$$

This says that the original figure moved 5 units to the left (-5) and 1 unit up (+1)

*The image is in noted with prime notation marks.
(Apostrophe's in the English world!) *

Ex: Draw triangle RST with vertices R(-6, 2) S (-6, 8) and T(-2,2)
Translate the triangle using the rule (x,y) → (x + 8, y)



Ask yourself:

- How will I move on the x axis? How far and in what direction?

- How will I move on the y? How far and in what direction?

There is **another** way to write a translation! It is of the form T(a,b).

For example,

$$(x + a\ ,\ y + b) \rightarrow (x - 5,\ y + 1) \rightarrow T(-5,\ 1).$$

So, you would see T(-5,1) and know that the x-coordinate moves 5 units to the left (negative) and one unit up (positive).

EX: Draw parallelogram GHJK with vertices G(2,1) H (3,6) J(7,6) K (6,1)
Translate the figure using the rule T(-6, -3).

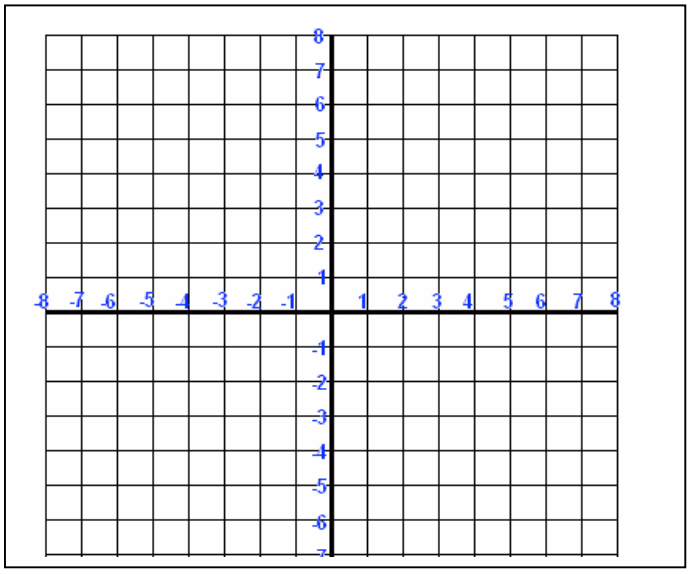
Answer the following questions:

- How will I move on the x-axis? How far and in what direction?

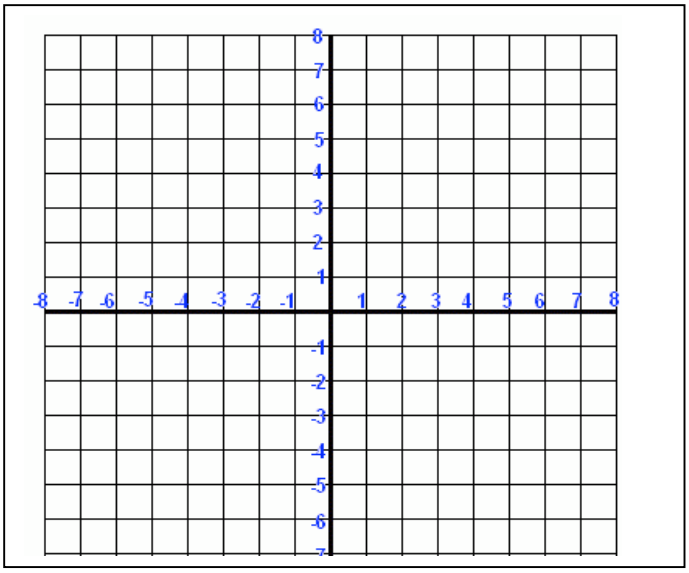
- How will I move on the y-axis? How far and in what direction?

- Put T(-6,3) into (x + a, y + b) form.

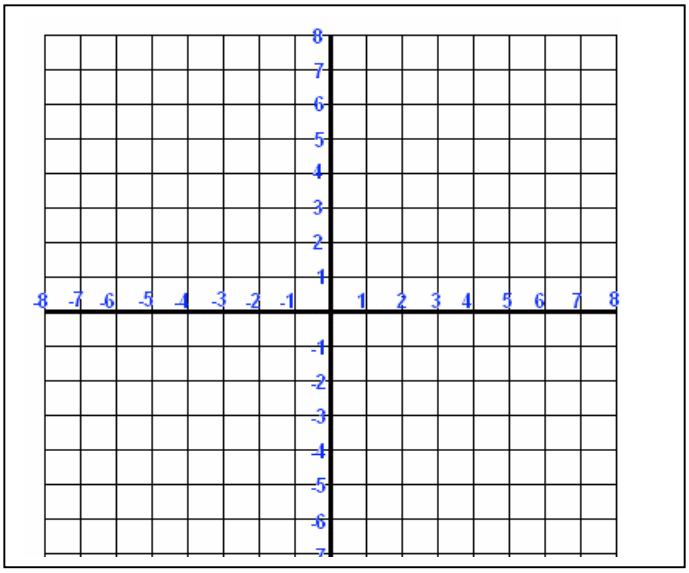
- Now put the original and translation on the graph!



TRY: Draw square ABCD with vertices A(-5, -1) B(-1, -1) C (-5,-5) D(-1, -5)
Translate the figure using T(3, 7)



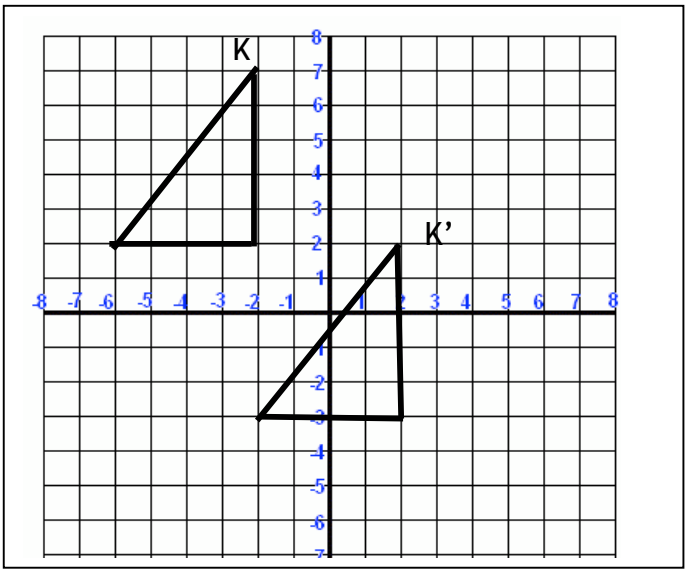
TRY: Draw triangle FGH with vertices F(-4,6) G(3,2) and H(-3,-2).
Translate the figure using (x , y) → (x + 4, y – 5)



Finding the rule

You may also be asked to identify the translation by giving the rule used to get from the original to the image. All you need to do is count!!!

EX:



First:
Decide which is the original.

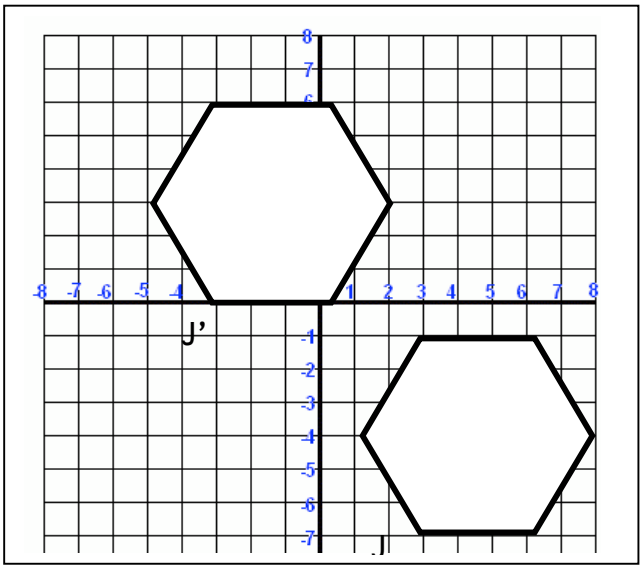
Second:
Pick a point on the original and count how you need to move to get to the image of that point.
(Up? Down? Left? Right?)

First: K is the original, it does not have a prime notation mark.

Second: To get from K to K' , I need to move 4 to the right (+4) and then I need to move 5 down (-5).

Answer: The translation is (x , y) ▶ (x + 4, y – 5) or T(4, -5)

TRY: What is the rule used in the translation below?



First:
Decide which is the original.

Second:
Pick a point on the original and count how you need to move to get to the image of that point.
(Up? Down? Left? Right?)