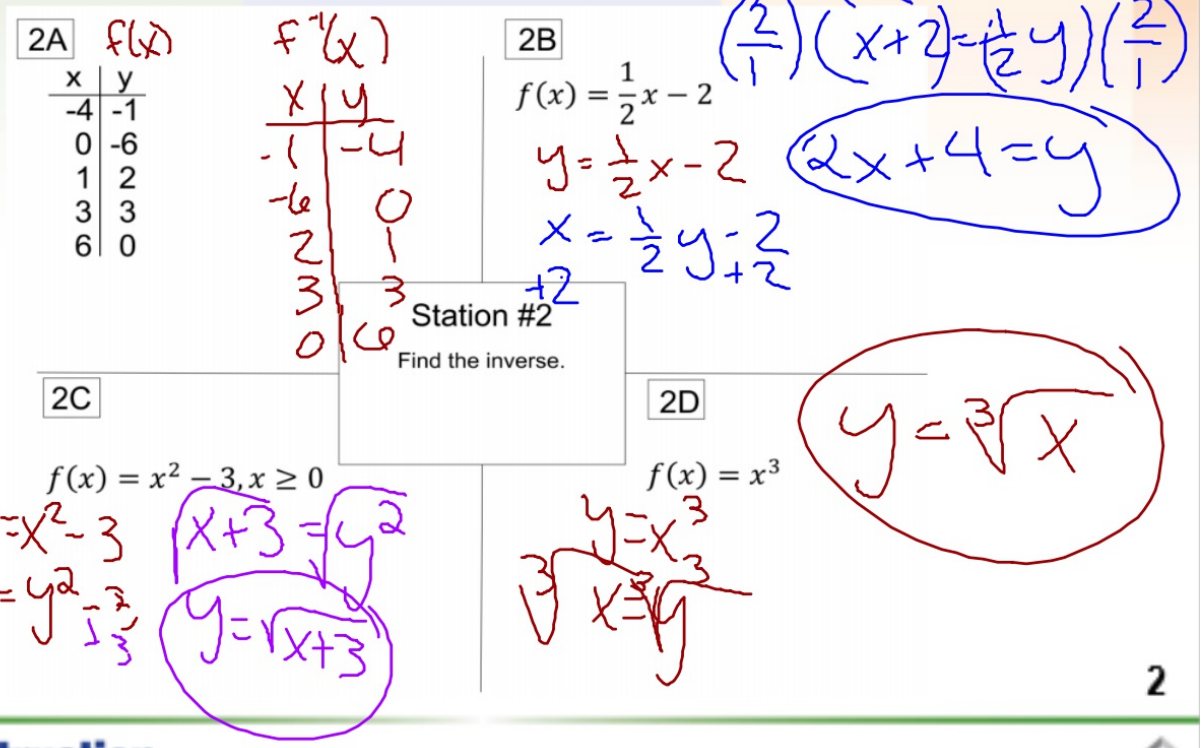
AGENDA

Tuesday, September 12, 2017

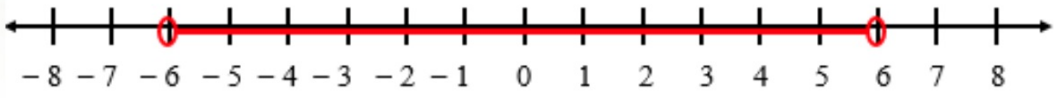
Warmup Day 2- on the warmup sheet from yesterday



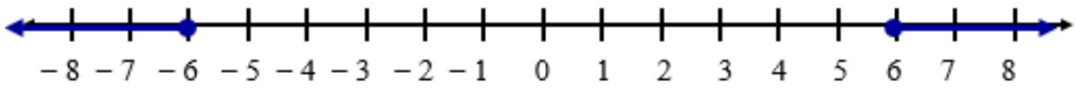
By definition, the equation $|x| = 3$ can be solved by finding real numbers at a distance of three units from 0. Two numbers satisfy this equation, 3 and −3.

So the solution set is $\{-3,3\}$.

$$|x| < 6$$



$$|x| \geq 6$$



Properties of Absolute Value

1. For $b > 0$, $|a| = b$ if and only if $a = b$ or $a = -b$.
2. $|a| = |b|$ if and only if $a = b$ or $a = -b$.

For any positive number b:

3. $|a| < b$ if and only if $-b < a < b$.
4. $|a| > b$ if and only if $a < -b$ or $a > b$.

Example 1 SOLVING ABSOLUTE VALUE EQUATIONS

Solve

a. $|5 - 3x| = 12$

Solution

$$|5 - 3x| = 12$$

$5 - 3x = 12$	or	$5 - 3x = -12$	Property 1
$-3x = 7$	or	$-3x = -17$	Subtract 5.
$x = -\frac{7}{3}$	or	$x = \frac{17}{3}$	Divide by -3.

$|a| = b$ property #1

$a = b$ or $a = -b$

$\left\{-\frac{7}{3}, \frac{17}{3}\right\}$

Example 2 SOLVING ABSOLUTE VALUE EQUATIONS

Solve

b. $|4x-3| = |x+6|$ $\quad |a| = |b|$

Solution

$$|4x-3| = |x+6|$$

$a = b$ or $a = -b$

$$4x-3 = x+6 \quad \text{or} \quad 4x-3 = -(x+6)$$ Property 2

$-x \quad +3 \quad -x \quad +3$

$$3x = 9 \quad \text{or} \quad 4x-3 = -x-6$$

$+x \quad +3 \quad +x \quad +3$

$$x = 3 \quad \text{or} \quad 5x = -3$$

$$x = -\frac{3}{5}$$

The solutionset is $\left\{-\frac{3}{5}, 3\right\}$.

Example 2 SOLVING ABSOLUTE VALUE INEQUALITIES

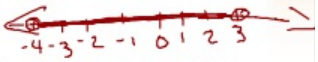
$-4 < x < 3$

Solve

a. $|2x + 1| < 7$

$|a| < b$ Property #3

$-b < a < b$



Solution

Use Property 3, replacing a with $2x + 1$ and b with 7.

$-7 < 2x + 1 < 7$

$|2x + 1| < 7$

$-7 < 2x + 1 < 7$	Property 3
$-8 < 2x < 6$	Subtract 1 from each part.
$-4 < x < 3$	Divide each part by 2.

b). $|2x+1| > 7$

$|a| > b$

① $a < -b$ or $a > b$ ②

Property #4

① $2x+1 < -7$

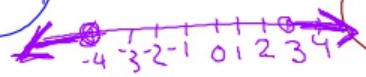
$2x < -8$

$x < -4$

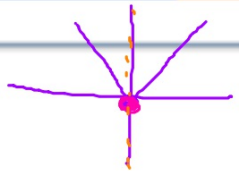
② $2x+1 > 7$

$2x > 6$

$x > 3$



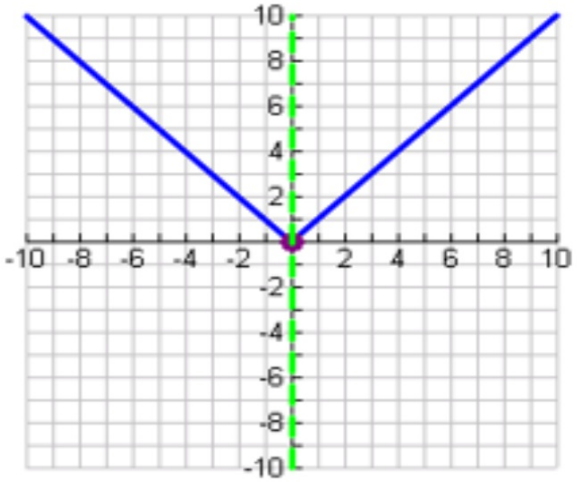
Vocabulary



- The function f(x) = |x| is an **absolute value function**.
- The highest of lowest point on the graph of an absolute value function is called the **vertex**.
- An **axis of symmetry** of the graph of a function is a vertical line that divides the graph into mirror images.
  - **An absolute value graph has one axis of symmetry that passes through the vertex.**

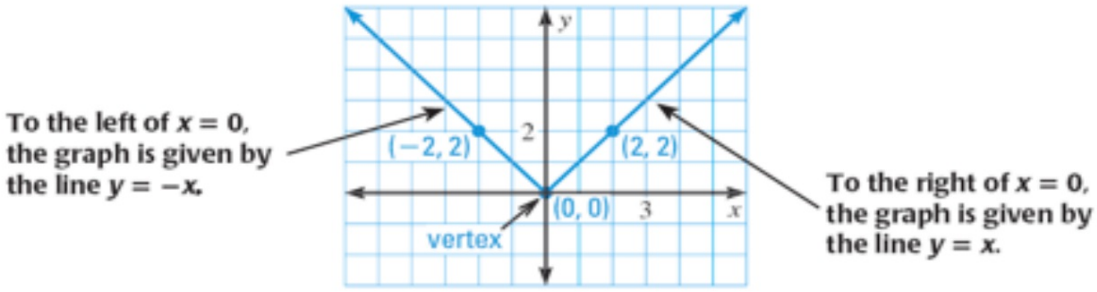
Absolute Value Function

$f(x) = |x|$



- **Absolute Value Function**
- **Vertex**
- **Axis of Symmetry**

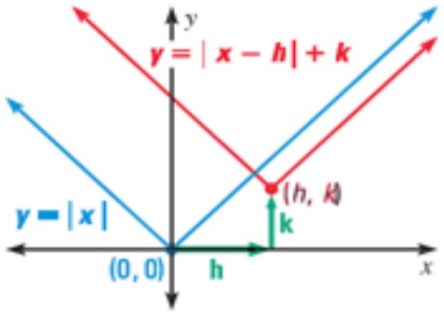
Parent Function



- V-shape
- It is symmetric about the y-axis (Axis of Symmetry)
- The **vertex** is the minimum point on the graph

Translation

A **translation** is a transformation that shifts a graph horizontally or vertically, but doesn't change the overall shape or orientation.

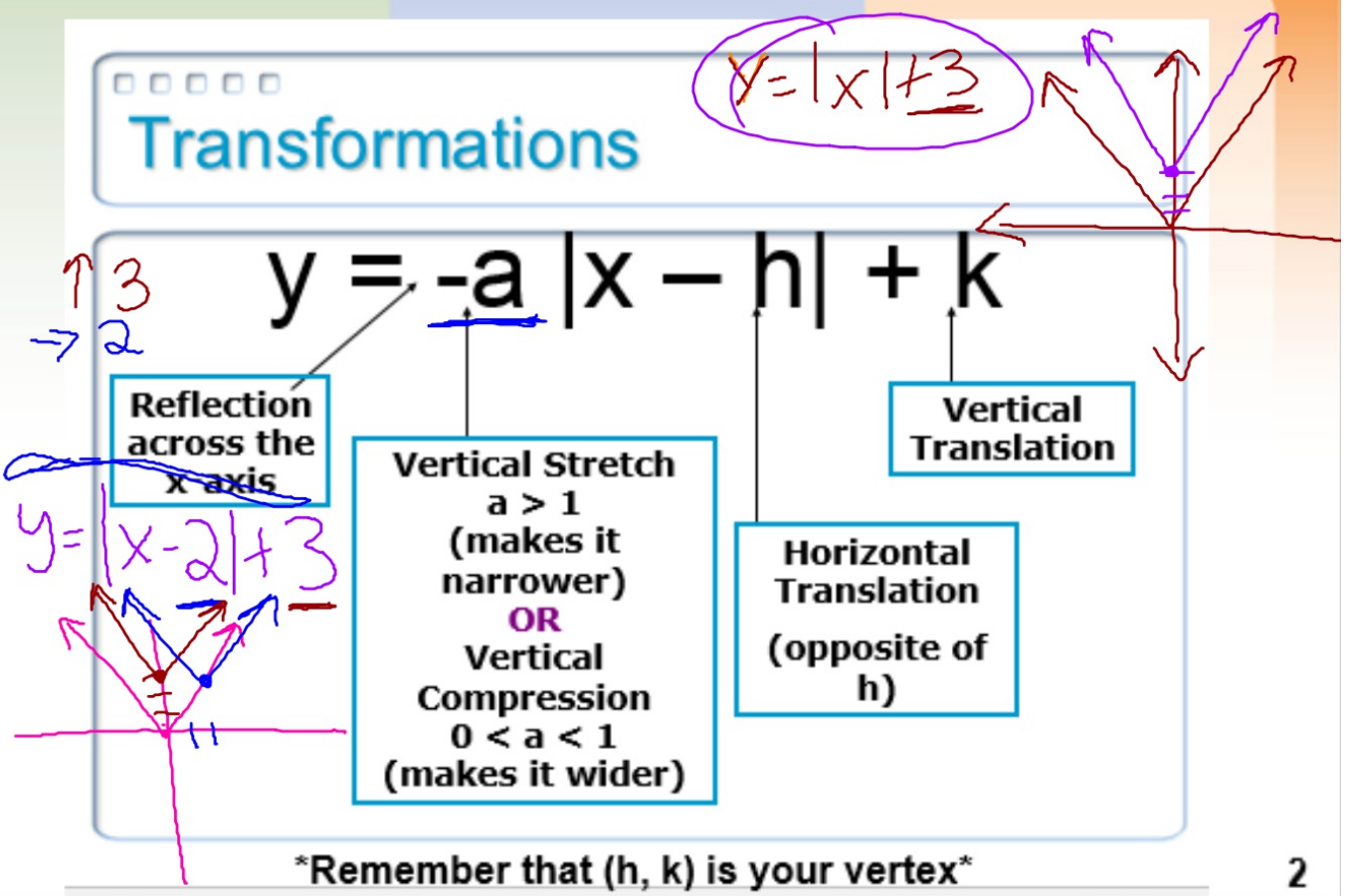


Transformations

$$y = -a|x - h| + k$$

- **Reflection across the x-axis**
- **Vertical Stretch**
  - **a > 1 (makes it narrower)**
  - **OR**
  - **Vertical Compression 0 < a < 1 (makes it wider)**
- **Horizontal Translation (opposite of h)**
- **Vertical Translation**

Remember that (h, k) is your vertex



EXIT TICKET

GO TO: GOOGLE CLASSROOM.com