


Cornell Notes 	Topic/Objective: <u>like Transformations of graphs</u>	Name:
		Class/Period: <u>4</u>
		Date: <u>10/26/16</u>

Essential Question: What are transformations and how do we apply them to graphs (in particular - parent functions)

Questions:

outside the par. the change is vertical

- Notes:
- ① $f(x) + K$ translates $f(x)$ vertically by K units up
 - ② $f(x) - K$ translates $f(x)$ down vertically K units
 - ③ $f(x + K)$ translates $f(x)$ horizontally left K units
 - ④ $f(x - K)$ translates $f(x)$ horizontally right K units

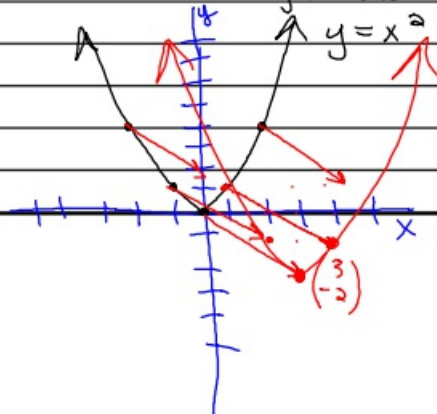
inside the par. the change is horizontal and it appears to be opposite what it looks like

TRANSLATION VECTOR

Translations can be represented by vectors in the form $\begin{pmatrix} a \\ b \end{pmatrix}$ where a is the horizontal component and b is the y-component.

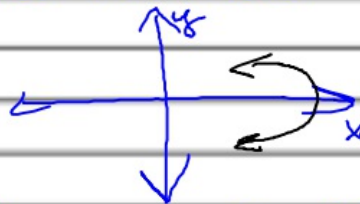
EX] the vector $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$ is a shift

3 units right and 2 units down.

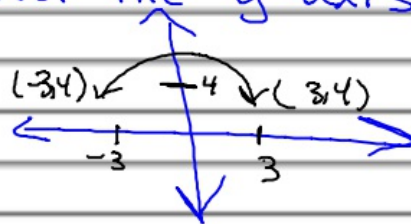


Questions:

Notes: ⑤ $-f(x)$ reflect $f(x)$ vertically over the x-axis



⑥ $f(-x)$ reflect $f(x)$ horizontally over the y-axis



⑦ $p f(x)$ is a vertical stretch by a factor of p .

⑧ $\frac{1}{p} f(x)$ is a vertical compression by a factor of $\frac{1}{p}$.

⑨ $f(px)$ is horizontal compression by a factor of $\frac{1}{p}$.

⑩ $f(\frac{1}{p}x)$ is a horizontal stretch by a factor of p .

$$y - k = (x - h)$$

$$y = (x - h) + k$$

$$Py = Kx$$

$$y = \frac{1}{p}x$$

Questions:

Notes:

Appropriate order for transformations

1. Horizontal translations \leftrightarrow
2. Stretching/Shrinking (compressions)
3. reflecting
4. Vertical translations

Ex 1 $f(x) = -|x-3| + 1$
 $\rightarrow 3$, reflect over x-axis, $\uparrow 1$

Ex 2 $f(x) = -2\sqrt{x+3} + 1$
 $\leftarrow 3$, vert. stretch factor of 2,
 reflect over x-axis, $\uparrow 1$

Exam Question

Ex The graph of $y = x^3 - 1$ is translated by applying a translation vector $\begin{pmatrix} 2 \\ 0 \end{pmatrix}$ followed by a vertical stretch with scale factor 2. Find the equation of the resulting graph in the form $y = ax^3 + bx^2 + cx + d$.

right 2 $y = 2(x-2)^3 - 1$

up/down 0 $y = 2[(x-2)(x-2)(x-2)] - 1$

$y = 2((x-2)(x^2 - 4x + 4)) - 1$

$y = 2(x^3 - 6x^2 + 12x - 8) - 1$

$y = 2x^3 - 12x^2 + 24x - 16 - 1$

$y = 2x^3 - 12x^2 + 24x - 17$

$(0, 24 \quad \# 2, 4, 6, 7)$

