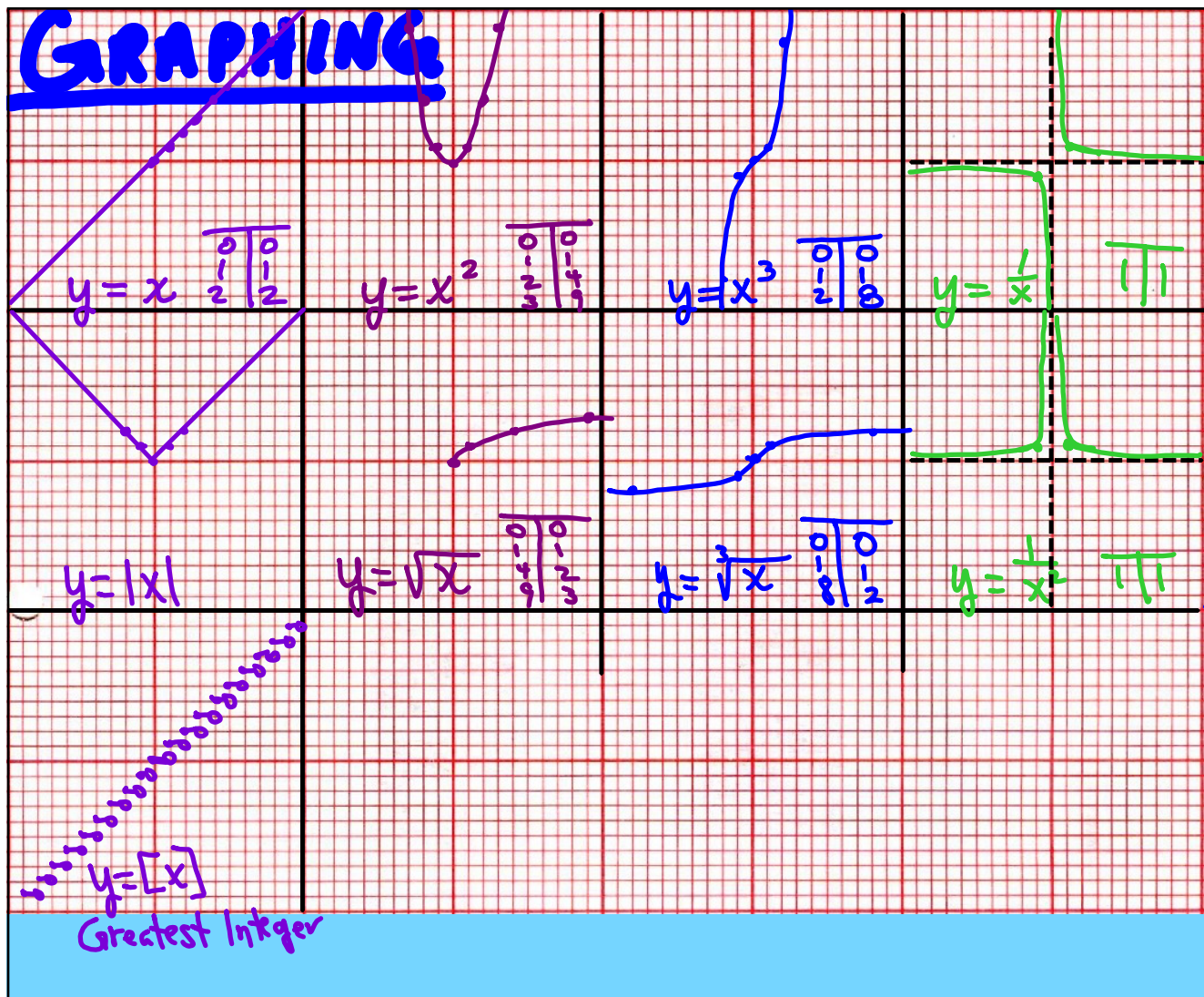




GRAPH TRANSFORMATION RULES

Moves up $f(x) + c$ $f(x) = x^3 + 4$

Moves down $f(x) - c$ $f(x) = \frac{1}{x^2} - 2$

Moves left $f(x+c)$ $f(x) = \sqrt{x+3}$

Moves right $f(x-c)$ $f(x) = (x-4)^2$

Flips over x-axis
(upside down) $-f(x)$
changes y-coord

$f(x) = -|x|$ 
 $f(x) = \sqrt{-x}$ 

Flips over y-axis
(sideways) $f(-x)$
changes x-coord

$f(x) = \sqrt{6-x}$
 $= \sqrt{-(x-6)}$

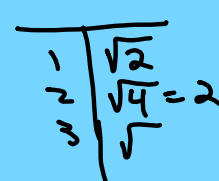
$|a| > 1$
vertical stretch
horiz. shrink

$af(x)$
changes y-coord

$y = 3x^2$ 

$0 < |a| < 1$
vertical shrink
horiz. stretch

$f(ax)$ $|a| > 1$ shrinks horiz
 $0 < |a| < 1$ stretches horiz.

$y = \sqrt{2x}$


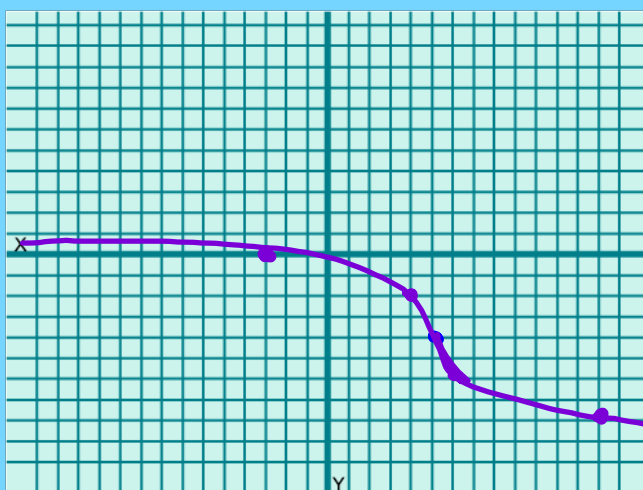
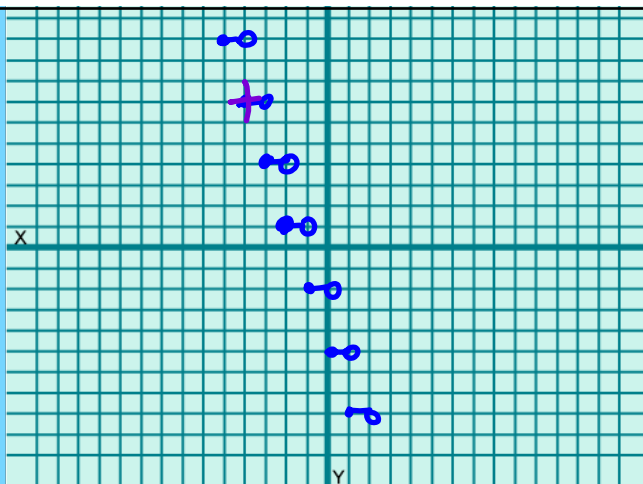
$$f(x) = -3[x+4] + 7$$

left UP

$$y = -2\sqrt[3]{x-5} - 4$$

Right Down

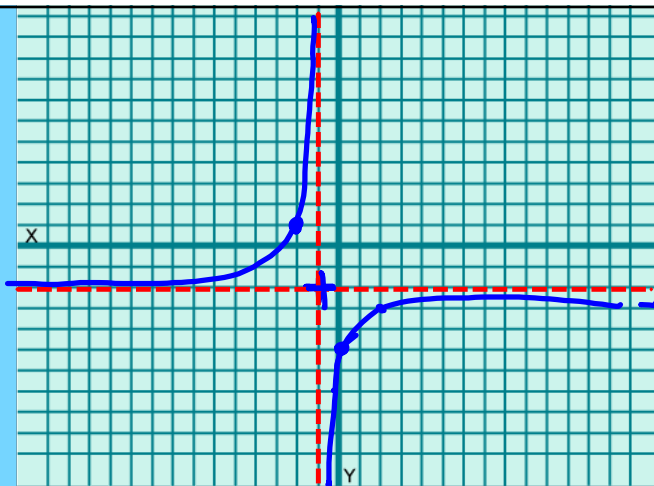
0	0
1	$x-2$
8	$2-4$



$$f(x) = \frac{-3}{x+1} - 2$$

Left 1 Down 2

$$\frac{1}{x+1} - 3 \quad -3 \cdot 1$$



Like 49 + 50 P2 Example

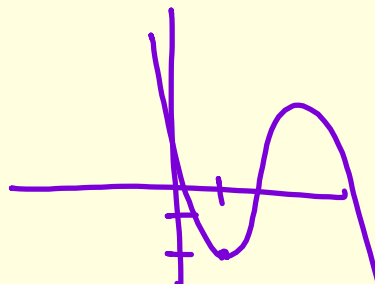
$$f(x) = x^3 - 3x^2$$

Right + flip over x-axis

$$f(x) = -(x-1)^3 + 3(x-1)^2$$

P3 Example

$$f(x) = -(x^3 - 3x^2) - 2$$



Right 1 Down 2
Flipped over x

$$f(x) = -(x-1)^3 + 3(x-1)^2 - 2$$

$$f(x) = \left[(x-1)^3 - 3(x-1)^2 \right] - 2$$