

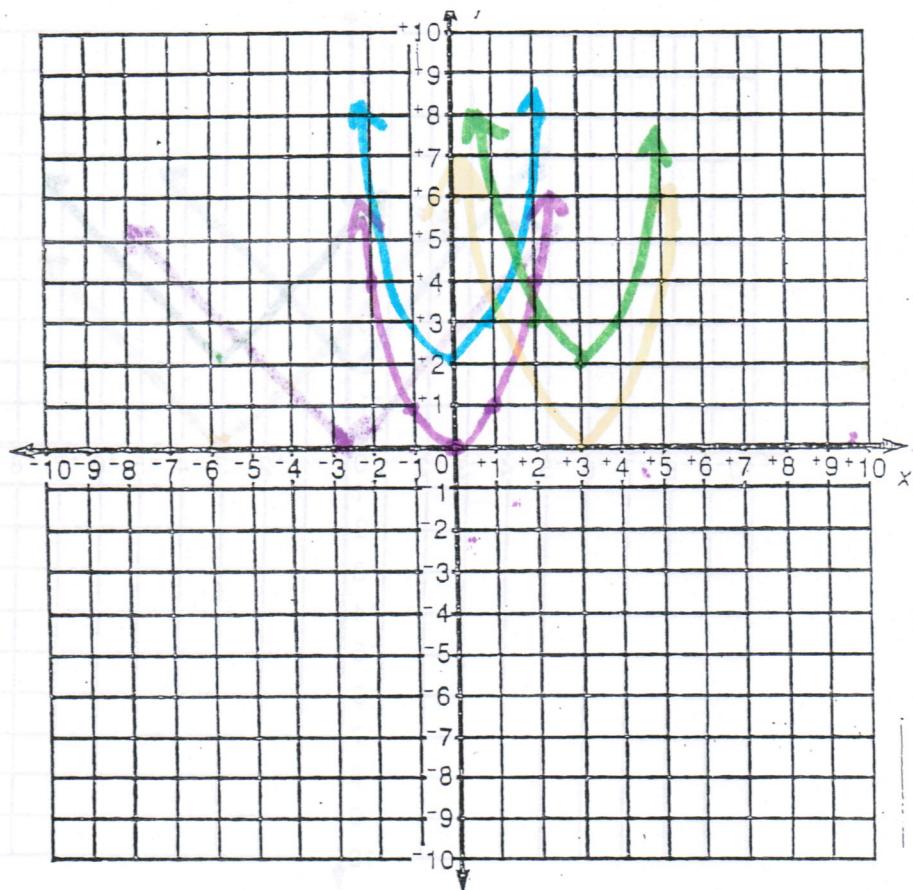
Key

$$y = x^2$$

$$y = x^2 + 2$$

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

$$y = (x-3)^2 + 2$$



All the graphs colors shifted the same way:  
Purple  $\rightarrow$  Parent function thru (0,0)

Blue  $\rightarrow$  parent shifted 2 up (all pts moved up 2 units)

Yellow  $\rightarrow$  parent shifted 3 to right

green  $\rightarrow$  Parent shifted 3 right and 2 up

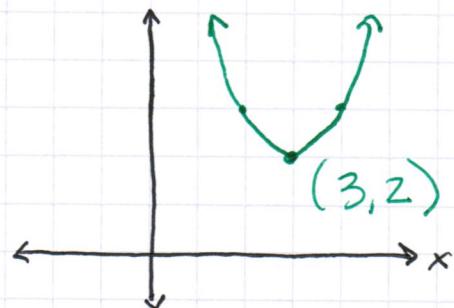
① I will understand shifts and flips of a function.

Looking at the green function of the parabola

$$y = (x - 3)^2 + 2$$

shifted 3 right  
2 up

Why?



$$y = (x - 3)^2 + 2$$

- 2

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

↓      ↓

2 goes with  $y$     3 goes with " $x$ "  
 vertical shift    horizontal shift  
 outside function    inside function

3 makes right side zero  
2 makes left side zero

but because we swing the 2 so we isolate  
y our equation looks like

$$y = (x - 3)^2 + 2$$

↑      ↓

opp      same

inside function (with the  $x$ )  $\Rightarrow$  opp  
outside function ("goes with  $y$ ")  $\Rightarrow$  same

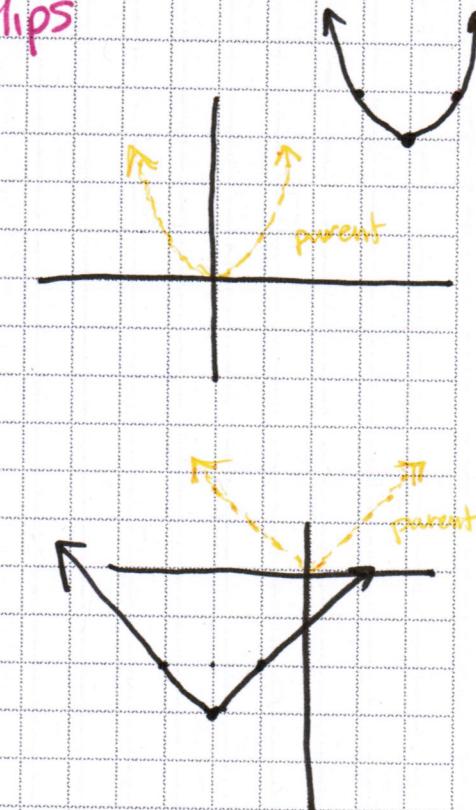
I will understand shifts & flips of a function.

Ex1]

$$y = (x-4)^2 + 3$$

↓  
opp      ↓  
          same

shift → rt 4 up 3

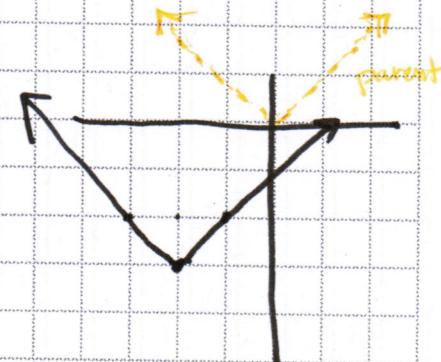


Ex2]

$$y = |x+2| - 3$$

↓  
opp      ↓  
          same

shift → Lt 2 down 3

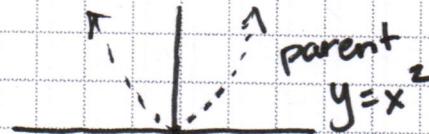


FLIPS → always describe flips before shift

↳ negative outside function flips over x-axis

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

flip over x-axis



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

↑  
flip    rt 2    up 3

flips over x-axis

rt 2 up 3

