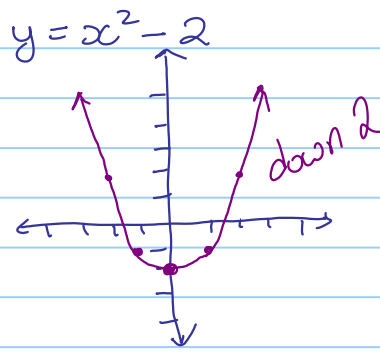
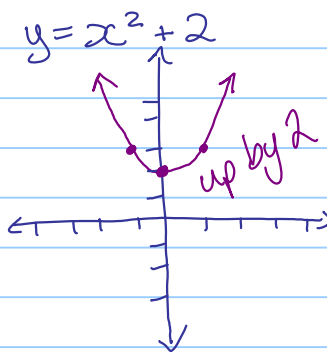
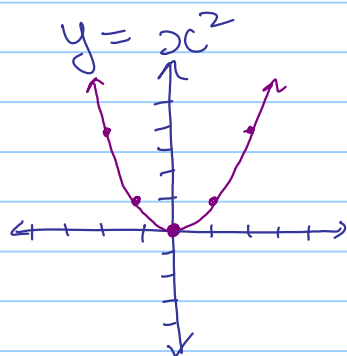


### 3.1 Translations

Note Title

02/10/2012

Draw each graph:



$$\begin{aligned}(0,0) &\rightarrow (0,2) \\ (-1,1) &\rightarrow (-1,3) \\ (1,1) &\rightarrow (1,3)\end{aligned}$$

$$\begin{aligned}(0,0) &\rightarrow (0,-2) \\ (-1,1) &\rightarrow (-1,-1) \\ (1,1) &\rightarrow (1,-1)\end{aligned}$$

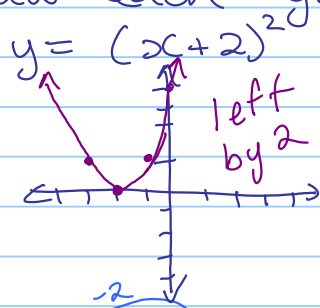
Function notation:  $y = f(x) + 2$   
 $y - 2 = f(x)$

Replacement notation:  $y \rightarrow y - 2$

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

$$y \rightarrow y + 2$$

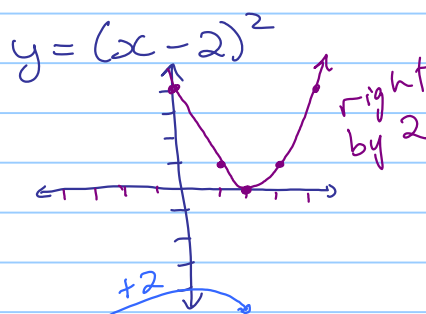
Draw each graph:



$$\begin{aligned}(0,0) &\rightarrow (-2,0) \\ (-1,1) &\rightarrow (-3,1) \\ (1,1) &\rightarrow (-1,1)\end{aligned}$$

$$y = f(x+2)$$

$$x \rightarrow x+2$$



$$\begin{aligned}(0,0) &\rightarrow (2,0) \\ (-1,1) &\rightarrow (1,1) \\ (1,1) &\rightarrow (3,1)\end{aligned}$$

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

$$x \rightarrow x-2$$

In general:  $y - k = f(x - h)$  is a translation horizontally by  $h$  and vertically by  $k$ .

For the transformation  $y - 3 = f(x + 5)$ ,  
a) describe what happens to the graph in words

left by 5, up by 3

b) If  $f(-2) = 1$  is a point on  $y = f(x)$ ,  
what is a point on the new graph?

$$(-2, 1) \rightarrow (-7, 4)$$

How has the graph of  $y = \frac{2}{x+5} + 1$

been transformed if the original function was:

a)  $y = \frac{2}{x}$

$$y - 1 = \frac{2}{x+5} \quad +1$$

left by 5  
up by 1

b)  $y = \frac{2}{x-1} + 3$

$$y = \frac{2}{x+5} + 1$$

left 6  
down by 2