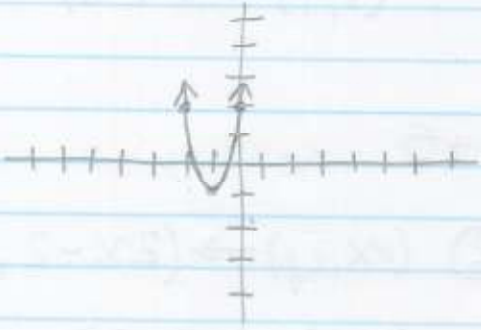
November 8th, 2007

Acceptable Graphing Methods

① Transformational method using vertex & stretch

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



vertex → (-1, -1)
stretches → v.s. of 3

(1, 1) ← original (1,1), (2,4) (3,9), (4,16)...
↓
(1, 3) ← y is multiplied by 3 (v.s)

② Mapping rule

$y = 3(x+1)^2 - 1$ $\quad (x, y) \rightarrow (x-1, 3y-1)$

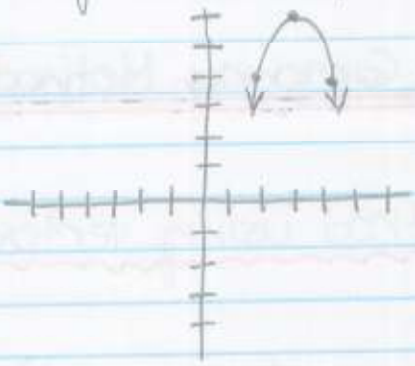
plot vertex (-1, -1)

(-1, 1) → (-2, 2)
(1, 1) → (0, 2) PLOT

Plug in equation $(x-1, 3y-1)$
ex. $(-1)-1, 3(1)-1$
$= (-2, 2)$

* Pick any two point of either side of vertex
Must be from original graph such as (-1, 1), (1, 1), (2, 4)...

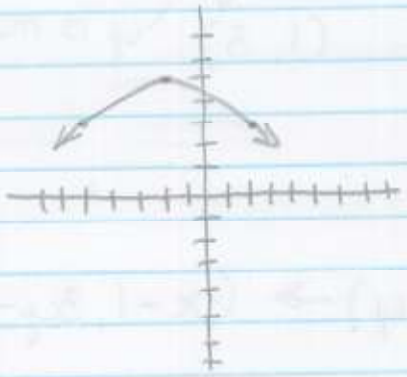
$y = -2(x-3)^2+6$



① vertex (3, 6)
v.s. of 2
reflect in x

② $(x, y) \rightarrow (x+3, -2y+6)$
$(-1, 1) \rightarrow (2, 4)$
$(1, 1) \rightarrow (4, 4)$

$y = -\frac{1}{2}(\frac{1}{2}(x+2))^2+5$



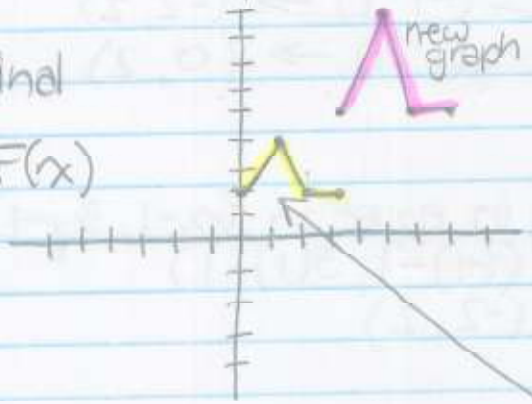
② $(x, y) \rightarrow (2x-2, -\frac{1}{2}y+5)$

$(2, 4) \rightarrow (2, 3)$
$(-2, 4) \rightarrow (-6, 3)$

Sketch $y = 2F(x-3)+1$ for $f(x)$ below

= original

$F(x)$



v.s of 2
right 3
up 1

$(x, y) \rightarrow (x+3, 2y+1)$

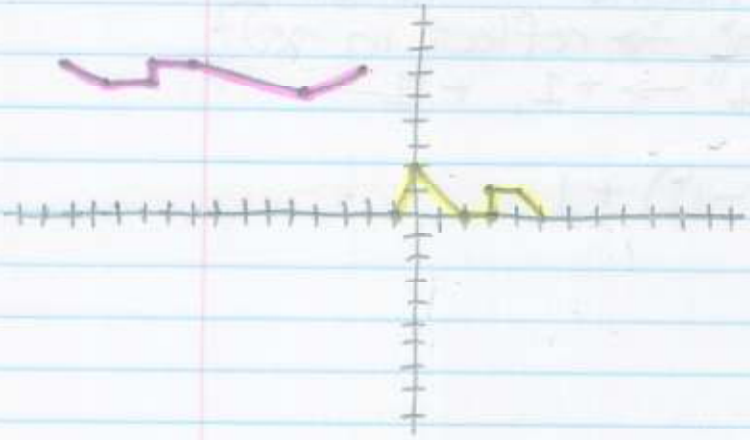
$(0, 2) \rightarrow (3, 5)$
$(1, 4) \rightarrow (4, 9)$
$(2, 2) \rightarrow (5, 5)$
$(3, 2) \rightarrow (6, 5)$

pick those points

= original

= new

Sketch $y=-\frac{1}{2}(-\frac{1}{2}(x+5))+6$

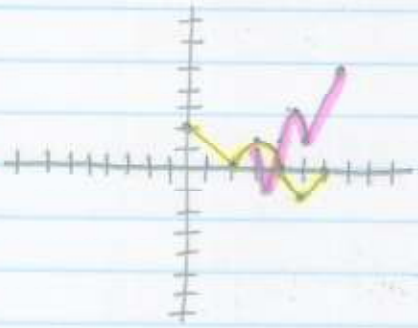


$(x, y) \rightarrow (-2x-5, -\frac{1}{2}y+6)$

$(-1,0) \rightarrow (-3,6)$
$(0,2) \rightarrow (-5,5)$
$(2,0) \rightarrow (-9,6)$
$(3,0) \rightarrow (-11,6)$
$(3,1) \rightarrow (-11, 5.5)$
$(4,1) \rightarrow (-13, 5.5)$
$(5,0) \rightarrow (-15,6)$

PLOT

Sketch $2F(-2(x-6))+1$



$(x, y) \rightarrow (-\frac{1}{2}x+6, 2y+1)$

$(0,2) \rightarrow (6,5)$
$(2,0) \rightarrow (5,1)$
$(3,1) \rightarrow (4.5,3)$
$(4,0) \rightarrow (4,1)$
$(5,-1) \rightarrow (3.5,-1)$
$(6,0) \rightarrow (3,1)$

PLOT

"Squish it by half in x" → h.s. of ½
"pull it to twice its height" → v.s. of 2
"flip it upside down" → reflect in x
"move right 1 up 1" → +1, +1

$$y = -2F(2(x-1)) + 1$$