

Graphing by Transformations

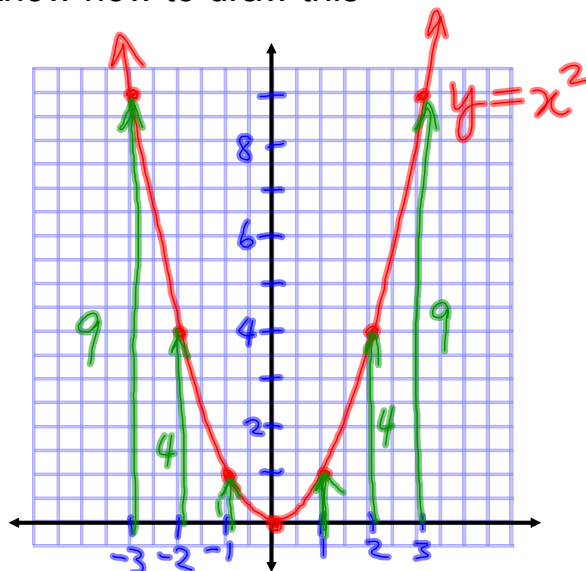
Part I: Vertical & Horizontal Translations

Apr. 30/2010

A. The Parent Function: $y = x^2$

All parabolas are based on the parent function, $y = x^2$. You must know how to draw this basic graph.

x	$y = x^2$
-3	9
-2	4
-1	1
0	0
1	1
2	4
3	9



Apr 14-7:45 PM

B. Translating the Parent Function, $y = x^2$

All parabolas are transformations of the parent function, $y = x^2$, which has a vertex at (0, 0)

Given $y = a(x - h)^2 + k$

h is the horizontal translation (or shift) left/right.

k is the vertical translation (or shift) up/down.

These translations move the vertex from (0, 0) to (h , k), but the shape of the parabola does not change.

Apr 29-7:38 PM

See Geogebra quadratic translation demo
(click here for link)

Apr 29-9:10 PM

Ex.1 For the following relations,

- i) state the vertex
- ii) state the axis of symmetry
- iii) state the transformations
- iv) sketch the relation

(a) $y = (x + 2)^2 - 4$ (b) $y = (x - 3)^2 - 1$

Apr 29-9:11 PM

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

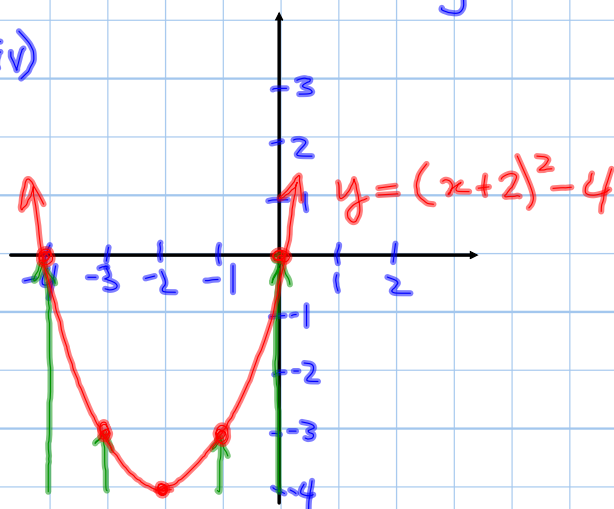
- i) state the vertex
- ii) state the axis of symmetry
- iii) state the transformations
- iv) sketch the relation

(i) $V(-2, -4)$

(ii) $x = -2$ (eqn. of a vertical line)

(iii) shifted left by 2
shifted down by 4

(iv)



Apr 29-9:13 PM

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

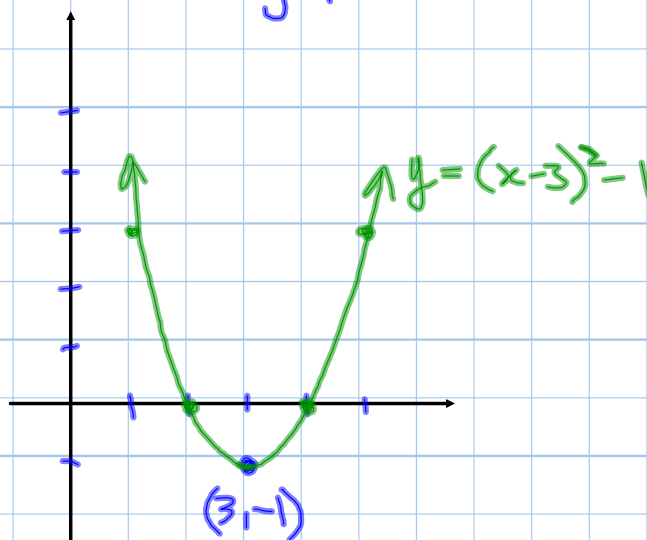
- i) state the vertex
- ii) state the axis of symmetry
- iii) state the transformations
- iv) sketch the relation

(i) $V(3, -1)$

(ii) $x = 3$

(iii) shifted right by 3
shifted down by 1.

(iv)



Apr 29-9:13 PM

Ex.2 Determine the equation and sketch the graph
of the following translations applied to $y = x^2$

- translate 3 units left
- translate 2 units down

$$\} V(-3, -2)$$

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

Apr 29-9:13 PM

Assigned Work:

p. 365 # 2, 3abd, 4, 7bc, 11ab

Mar 20 - 4:57 PM