

Translations of a Quadratic Relation (in Vertex Form)Apr. 14/
2016

1. factored form: $y = a(x - s)(x - t)$

2. standard form: $y = ax^2 + bx + c$

3. vertex form: $y = a(x - h)^2 + k$

a tells us the **direction of opening** (up or down),
and any **vertical scaling** (stretch or compression)

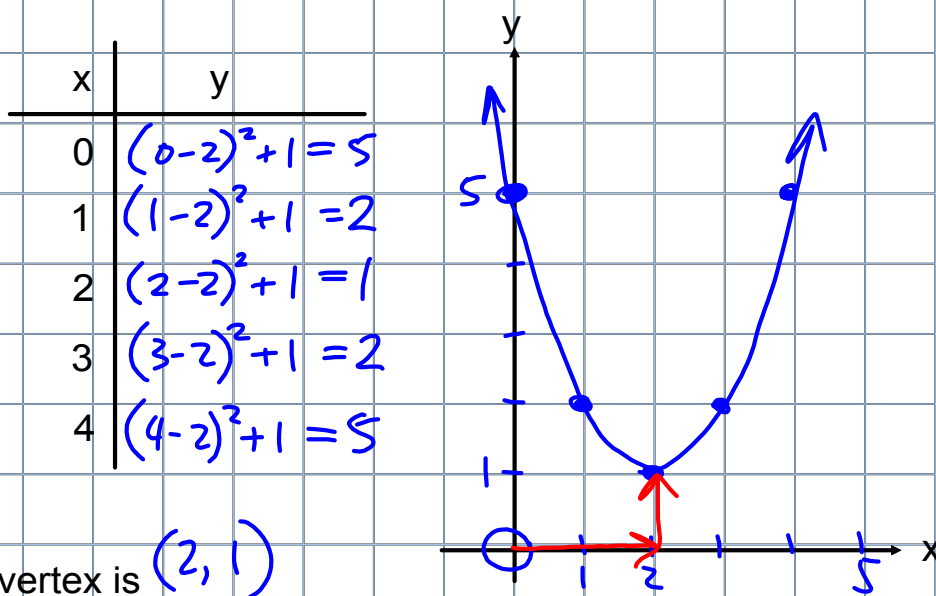
$|a| > 1$

$|a| < 1$

h is the **x-coordinate** of the vertex.

k is the **y-coordinate** of the vertex.

Mar 20 - 4:17 PM

Ex.1 Graph $y = (x - 2)^2 + 1$ using a TOV.

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

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The vertex of the parent function, $y = x^2$, is (0, 0).

If the vertex has moved from (0, 0) to (h, k) then the graph has been :

translated _____ (up or down)

and _____ (left or right)

Vertex Form: $y = a(x - h)^2 + k$

What about the signs of h and k?

don't
copy

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Ex.2 State the coordinates of the vertex and direction of opening.

(a) $y = (x - 5)^2 + 4$ Vertex (5, 4) Opens UP

(b) $y = (x + 3)^2 + 11$ Vertex (-3, 11) Opens UP

(c) $y = -2(x - 6)^2 - 8$ Vertex (6, -8) Opens DOWN

(d) $y = \frac{3}{4}(x + 13)^2 - 2$ Vertex (-13, -2) Opens UP

(e) $y = -(x - 4)^2 + 5$ Vertex (4, 5) Opens DOWN

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See Geogebra quadratic translation demo
(click here for link)

Nov 10-8:19 AM

Ex. 3. Identify the transformations (in the correct order), the vertex, axis of symmetry, and the direction of opening.

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

$L \rightarrow R$

① horizontal shift right by 2

OR h. shift right by 2

② v. shift down by 3.

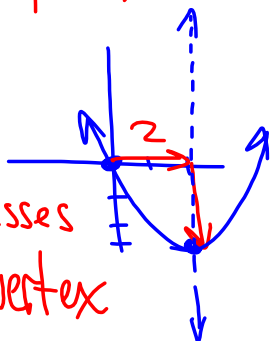
$V(0, 0)$ parent

A. of S.: $x = 2$

$V(2, -3)$

↑

A. of S passes through vertex



dir. open: UP

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$$b) y = 2(x + 4)^2 + 0$$

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

$$V(-4, 0)$$

- ① v. stretch by 2
- ② h. shift left by 4

$$A. of S.: x = -4$$

opens: UP

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$$c) y = -0.5x^2 + 4$$

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

$$y = -0.5(x)^2 + 4$$

$$y = -0.5(x - 0)^2 + 4$$

$$V(0, 4)$$

$$A. of S.: x = 0$$

- ① v. reflection opens down.
- ② v. compression by $\begin{matrix} \nearrow 2 \\ \searrow 0.5 \text{ or } \frac{1}{2} \end{matrix}$
- ③ v. shift up by 4

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Assigned Work:

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