

Transformations with Quadratic Functions

TRY THIS!

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

Use a calculator to generate a table of values for the function

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

x	y
1	
2	
3	
4	
5	
6	

Next, simplify the function by squaring, distributing, and collecting like terms.

$$y = 2(\quad) (\quad) + 4$$

Square (write twice)

$$y = 2(\quad + \quad + \quad + \quad) + 4$$

Multiply (FOIL)

$$y = 2(\quad + \quad + \quad) + 4$$

$$y = \quad + \quad + \quad + 4$$

Distribute

$$y =$$

Collect Like Terms

Would this expression generate the same table of values?

Use your calculator to make sure.

- These equations are both examples of _____ functions.

More importantly, these equations show the two special forms of these types of functions:

Form	Equation	Uses
Standard Form		Simplified form
Vertex Form		- Transformation of parent function - Sketch graphs - Determine equation from a graph

Transformation Effects: When a quadratic function is given in the vertex form, the parent function $y = x^2$ undergoes the following transformations.

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

a

The function reflects over the x -axis if a is negative.

The graph stretches or compresses by a factor of $|a|$.

- If $|a| > 1$, the graph stretches vertically.

$$0 < |a| < 1$$

- If $0 < |a| < 1$, the graph compresses vertically.

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Brendan G. Carr



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