

5.3: Graphing from Standard Form

<p>Now that we know how to find all of the critical points given an equation in standard form, it's time to graph them!</p>	<p>What information do you need in order to graph?</p> <ul style="list-style-type: none"> - vertex - growth pattern • 5 points
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BUT FIRST! Let's look at the parent graph: $y = x^2$

<p>Parent Graph</p>	<p>x/y Table</p> <table border="1"> <tr><th>x</th><th>y</th></tr> <tr><td>-3</td><td>9</td></tr> <tr><td>-2</td><td>4</td></tr> <tr><td>-1</td><td>1</td></tr> <tr><td>0</td><td>0</td></tr> <tr><td>1</td><td>1</td></tr> <tr><td>2</td><td>4</td></tr> <tr><td>3</td><td>9</td></tr> </table>	x	y	-3	9	-2	4	-1	1	0	0	1	1	2	4	3	9	<p>Odd growth each time Pattern</p> <p>Over 1, up 1a Over 1, up 3a ...</p>
x	y																	
-3	9																	
-2	4																	
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STANDARD FORM:

$$y = ax^2 + bx + c$$

Example 1: Find the vertex of the parabola. Use the vertex and the parent graph's pattern to graph each quadratic function.

a) $a=1$ $b=-6$ $c=13$
 $y = x^2 - 6x + 13$

$1a = 1(1) = 1$ over 1, up 1
 $3a = 3(1) = 3$ over 1, up 3

Vertex
 $x = \frac{b}{2a} = \frac{-6}{2} = -3$
 $y = (-3)^2 - 6(-3) + 13 = 9 + 18 + 13 = 40$
 (3, 4)

b) $a=1$ $b=-2$ $c=-3$
 $y = x^2 - 2x - 3$

Growth
 $1a = 1(1) = 1$
 $3a = 3(1) = 3$
 $5a = 5(1) = 5$

Vertex
 $x = \frac{b}{2a} = \frac{-2}{2} = -1$
 $y = (-1)^2 - 2(-1) - 3 = 1 + 2 - 3 = 0$
 (-1, -4)

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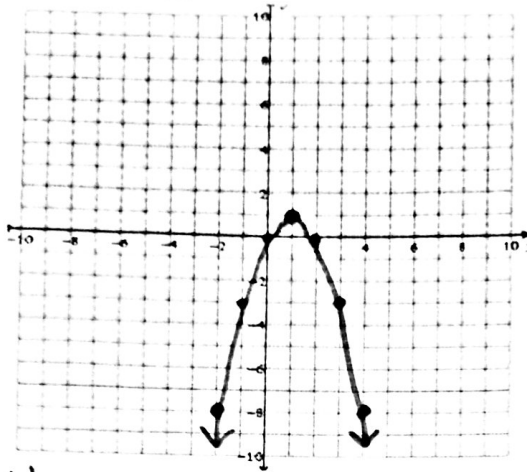
Vertex
 $x = \frac{-b}{2a} = \frac{6}{2} = 3$ $y = (3)^2 - 6(3) + 13 = 4$
 (3, 4)

b) $y = x^2 - 2x - 3$ $a=1$ $b=-2$ $c=-3$

Growth
 $1a = 1(1) = 1$
 $3a = 3(1) = 3$
 $5a = 5(1) = 5$

Vertex
 $x = \frac{-b}{2a} = \frac{2}{2} = 1$
 $y = (1)^2 - 2(1) - 3 = -4$
 (1, -4)

c) $a = -1$ $b = 2$
 $y = -x^2 + 2x$



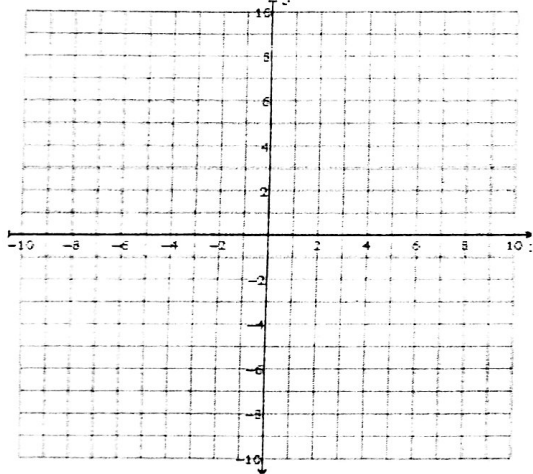
Growth

$1a = 1(-1) = -1$ Over 1, down 1
 $3a = 3(-1) = -3$ Over 1, down 3
 $5a = 5(-1) = -5$ Over 1, down 5

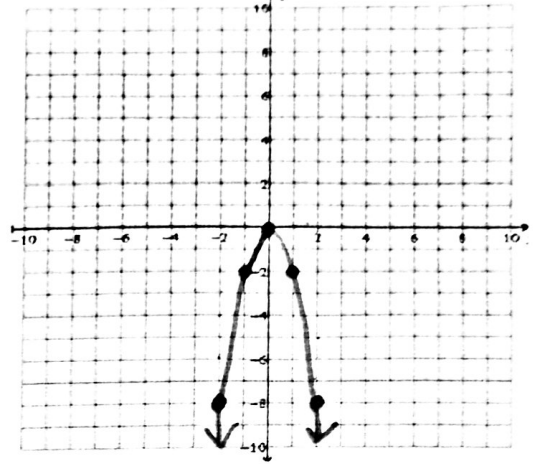
Vertex

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

e) $y = 2x^2 + 12x + 19$



d) $a = -2$ $b = 0$ $c = 0$
 $y = -2x^2$



Growth

$1a = 1(-2) = -2$ Over 1, down 2
 $3a = 3(-2) = -6$ Over 1, down 6

Vertex

$x = \frac{0}{2(-2)} = 0$ $y = -2(0)^2 = 0$
 $(0, 0)$

f) $y = -x^2 - 2x + 2$

