

# Algebra 1

Chapter 9

Section 9-1

Mar 31-10:28 PM

## Quadratic Functions

- A quadratic function is a polynomial function with a degree of 2.

> Can be written:  $y = \underline{a}x^2 + \underline{b}x + \underline{c}$

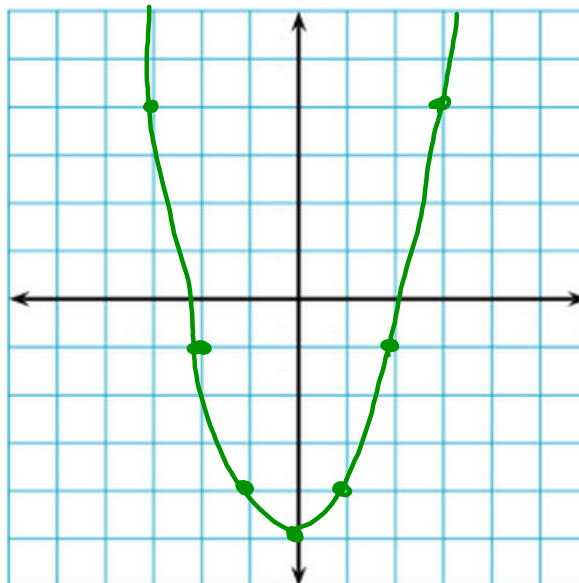
$$a \neq 0$$

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Graph the function

$$y = x^2 - 5$$

x	y
0	-5
1	-4
2	-1
3	4
-1	-4
-2	-1
-3	4

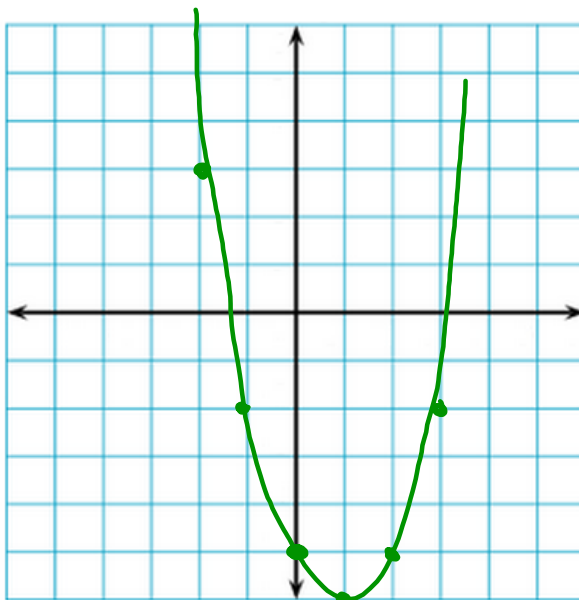


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Graph the function

$$y = x^2 - 2x - 5$$

x	y
0	-5
1	-6
-1	-2
2	-5
3	-2
-2	3
-3	10

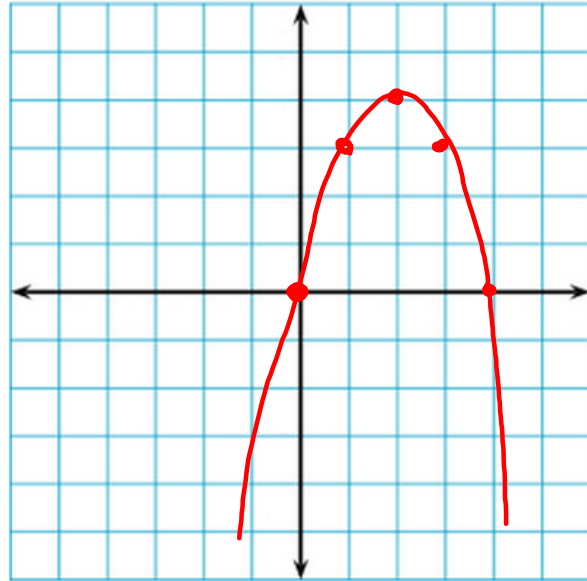


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Graph the function

$$y = -x^2 + 4x$$

x	y
0	0
1	3
2	4
3	3
4	0



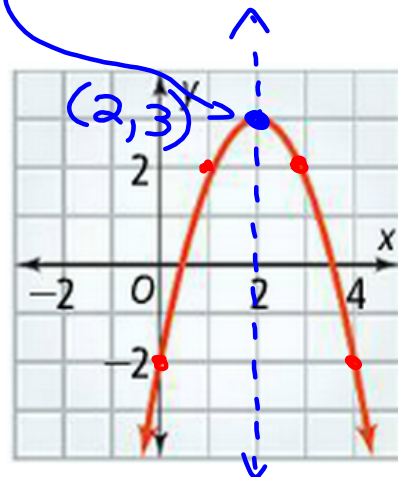
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## Parabolas

- The "U"-shaped graph of a quadratic function is a parabola. A parabola is *symmetric*, and will always have either a *vertex* that is the highest or lowest point.

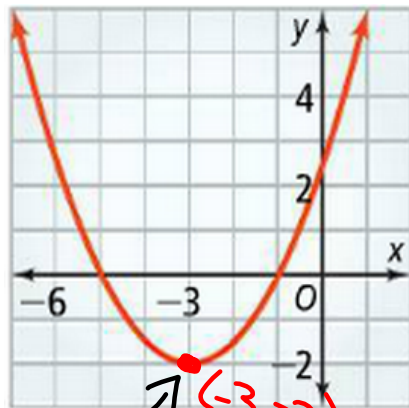
Axis of symmetry:  $x = 2$

Vertex:  $(2, 3)$  [*Maximum Value*]



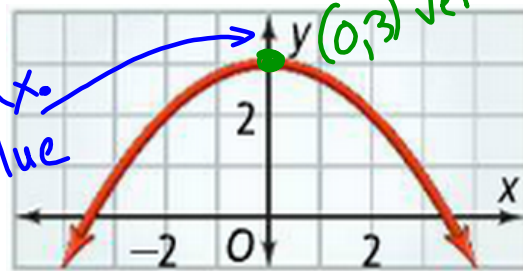
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Give the axis of symmetry and identify the vertex of each parabola. Determine if the vertex gives a maximum or minimum value.



min.  
value

$(-3, -2)$  vertex  
 $x = -3$  axis of sym.



max.  
value

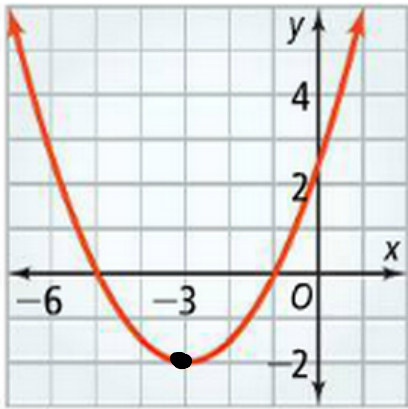
axis  
of  
sym •  $x = 0$

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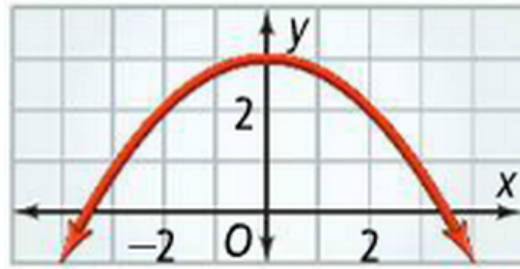
- The domain is a list of possible values of the independent variable (x).
  - > *For a quadratic function, the domain is always "all real numbers"*
- The range is a list of possible values of the dependent variable (y).

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Find the domain and range given the graph of each function.



Domain: All real numbers  
Range:  $y \geq -2$



Domain: All real numbers  
Range:  $y \leq 3$

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Find the domain and range given the equation of each quadratic function.

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

Domain: All real numbers  
Range:  $y \leq 3$

$$y = 6x^2 - 2$$

Domain: All real numbers  
Range:  $y \geq -2$

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