

Graphing Quadratic Functions

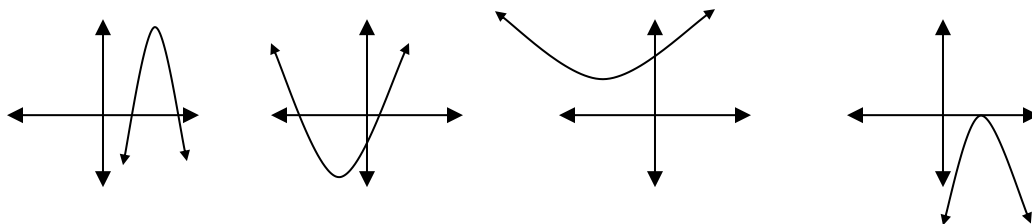
Notes 5.1

Key

Quadratic Function General Form →

$$ax^2 + bx + c = 0$$

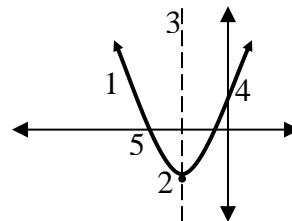
Examples of graphs of Quadratic Functions



VOCAB!!!

1. parabola
2. vertex
3. axis of symmetry

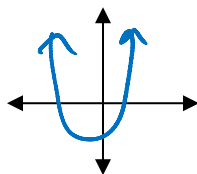
4. y-intercept
5. x-intercept



Watch as the following quadratic functions are graphed on the graphing calculator
Sketch each graph

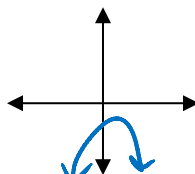
1) $y = x^2 + 2x - 5$

$a = 1$ $b = 2$ $c = -5$



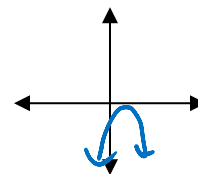
2) $y = -x^2 + 2x - 5$

$a = -1$ $b = 2$ $c = -5$



GUESS!
3) $y = -4x^2 + 7x - 3$

$a = -4$ $b = 7$ $c = -3$



What determines the direction of the parabola????? the a-value
(pos - up, neg - down)

For the following, state whether the parabola will open up or down

1) $y = 7x^2 + 4x - 12$

$a = 7$ $b = 4$ $c = -12$

direction up

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

$a = -3$ $b = 1$ $c = 0$

direction down

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

$a = 2$ $b = -4$ $c = 0$

direction up

The **vertex** is the highest or lowest point on the parabola. It is sometimes called the maximum or the minimum.

Using the calculator to find the vertex (the maximum or minimum):

1. Put the equation in Y_1
2. Graph in a window so you can see the vertex
3. Decide if there is a "max" or a "min"
4. Go to 2^{nd} \square Trace and choose either 3:minimum or 4:maximum
5. It will ask you for "Left Bound?" so arrow a little to the left of the vertex. Press \square Enter.
6. It will ask you for "Right Bound?" so arrow a little to the right of the vertex. Press \square Enter.
7. It will ask you for "Guess?". Press \square Enter.
8. It will then give you the x-value and y-value for the vertex (x, y).

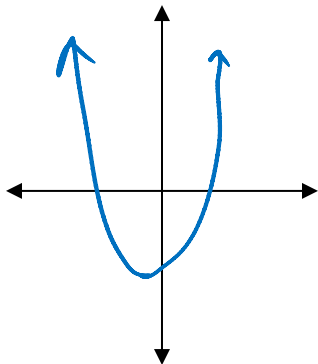
Use your graphing calculator to find the vertex for each quadratic function then sketch the graph. (include the axis of symmetry)

1) $y = x^2 + 2x - 5$

$a = 1$ $b = 2$ $c = -5$

direction up

Vertex (-1 , -6)



Axis of Symmetry

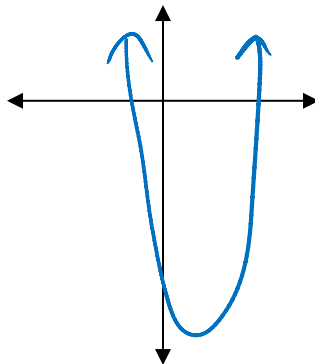
$x = -1$

2) $y = 2x^2 - 12x - 1$

$a = 2$ $b = -12$ $c = -1$

direction up

Vertex (3 , -19)



Axis of Symmetry

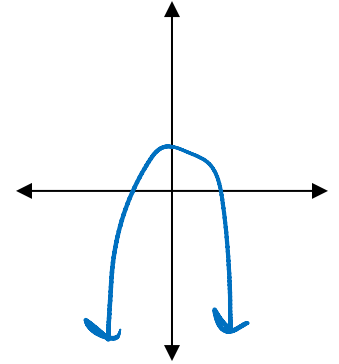
$x = 3$

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

$a = -1$ $b = 0$ $c = 2$

direction down

Vertex (0 , 2)



Axis of Symmetry

$x = 0$