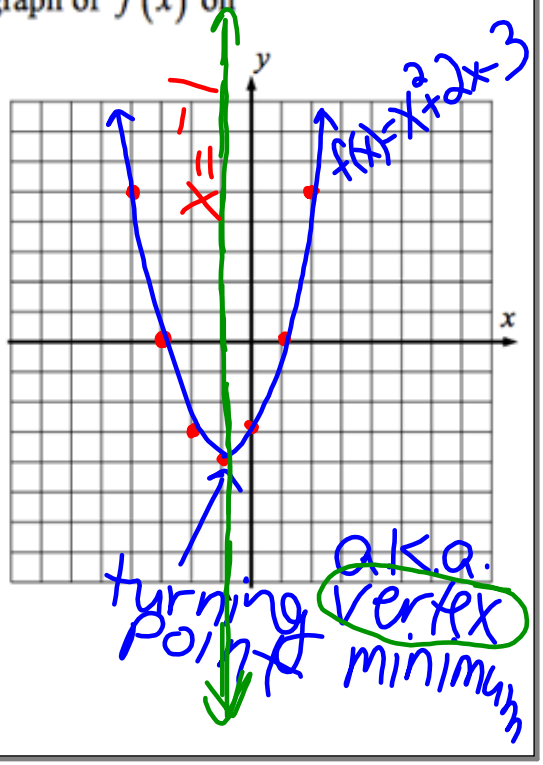
Consider the function $f(x)=x^2+2x-3$. #7 on H.W.

(a) Using your calculator, create an accurate graph of $f(x)$ on the grid provided.

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



(b) State the coordinates of the turning point of $f(x)$. Is this point a maximum or minimum?

(-1, -4)

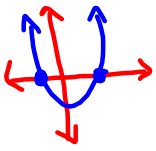
Line of symmetry

Mar 24-8:29 AM

Turning Point: where the graph changes direction.

Axis of symmetry: a vertical line that passes through the vertex, written in x= form.

Zeroes: x-intercepts; where y=0



Mar 24-8:30 AM

Graph the function: $y = 3x^2 + 6x - 4$

What is the vertex? $(-1, -7)$ (x, y)

What is the axis of symmetry? $x = -1$

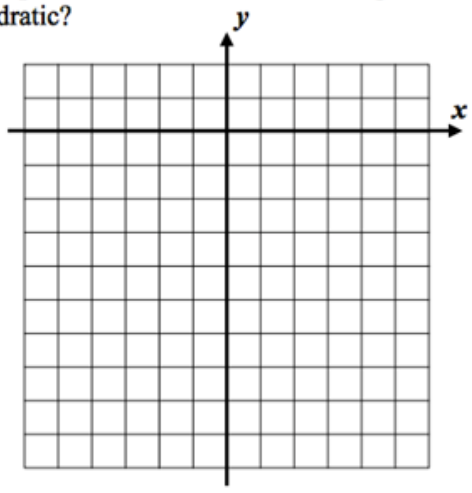
Mar 24-8:31 AM

Consider the simple quadratic function $y = -x^2$.

(a) Write this parabola in the form $y = ax^2$, where a is the leading coefficient. Then, fill out the table below.

x	$y = -x^2$	(x, y)
−3		
−2		
−1		
0		
1		
2		
3		

Graph the parabola given in this table on the grid provided. What is the range of this quadratic?



Range:

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Graph the following quadratics in the calculator.

$y = 2x^2$ y_1

$y = -2x^2$ y_2

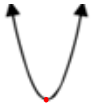
$y = 4x^2$ y_3

How do they compare? the graph (parabola) gets narrower b/c the a (leading coefficient) is increasing.

How can we get the parabola to become wider?

y =

Mar 24-8:33 AM

The parabola will **open upwards**, in other words look like  if $a > 0$.

This type of quadratic function will have a **minimum y-value.**

The parabola will **open downwards**, in other words look like  if $a < 0$.

This type of quadratic function will have a **maximum y-value.**

Mar 24-8:35 AM

What is the vertex and the axis of symmetry?

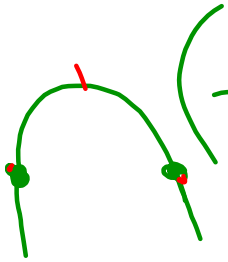
$\frac{-b}{2a}$ $\frac{4}{2}=2$

$y = x^2 + 4x - 5$ $(-2, -9)$ $x=-2$

$y = -2x^2 - 10x$ $(-2.5, 12.5)$

$y = \frac{1}{4}x^2 - 2x - 1$ $(4, -5)$ $x=4$

$\frac{2}{2(\frac{1}{4})}$ $\frac{2}{\frac{1}{2}}$



Mar 25-8:44 AM

The height of an object that is traveling through the air can be well modeled by a quadratic function that opens downward. An object is fired upward and its height in feet above the ground is given by:

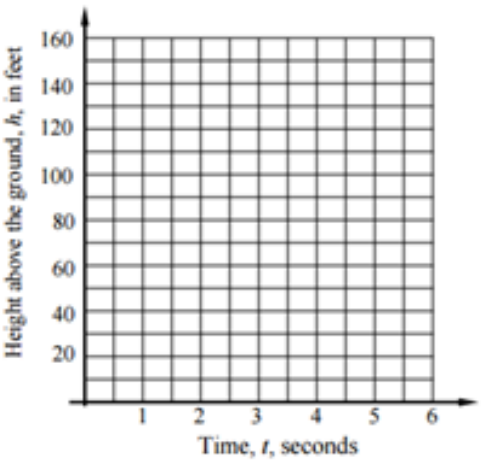
$h(t) = -16t^2 + 64t + 80$ where the input, t, is the time, in seconds, the object has been in the air

(a) Using your calculator, sketch a graph of the object's height for all times where it is at or above the ground.

(b) What is its maximum height in feet?

(c) At what time does it hit the ground?

(d) Over what time interval is its height increasing?



Mar 25-8:44 AM

How can we tell from the equation itself whether it will have a maximum or a minimum?

How does the range relate to the vertex?

a = − max

a = + min

Vertex (x, y)

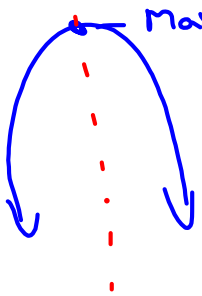
x = 2 (2, 7)

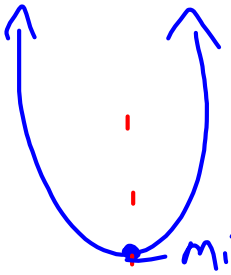
y ≤ 7

X = axis of Symmetry

Range

y ≤ vertex

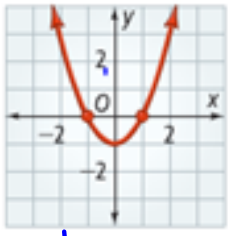




y ≥ vertex

Mar 25-8:45 AM

Graph $y = x^2 - 1$.



two

± 1

$0 = x^2 - 1$

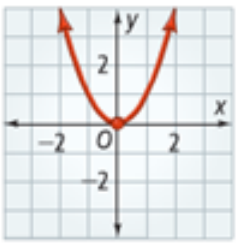
$+1 \quad +1$

$\sqrt{1} = \sqrt{x^2}$

$x = 1$

$x = -1$

Graph $y = x^2$.

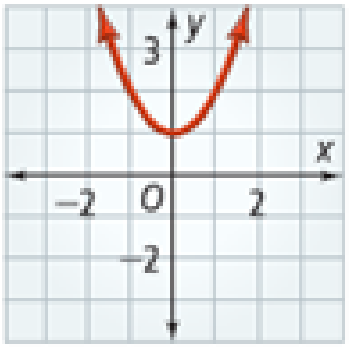


one

$0 = x^2$

0

Graph $y = x^2 + 1$.



none

$0 = x^2 + 1$

$\sqrt{-1} = \sqrt{x^2}$

Mar 25-8:46 AM

$$x^2 - 16 = 0$$

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$m^2 - 36 = 0$ $4d^2 + 16 = 16$

$+36 \quad +36$ $-16 \quad -16$

$\sqrt{m^2} = \sqrt{36}$ $\frac{4d^2}{4} = \frac{0}{4}$

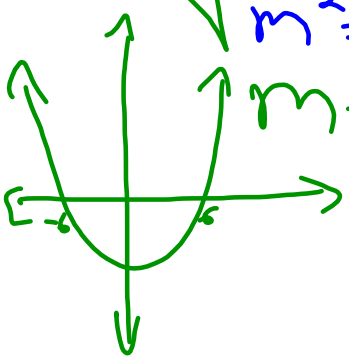
$m = \pm 6$ $\sqrt{d^2} = \sqrt{0}$

$d = 0$

$2x + 2 = 4$ $-2 \quad -2$

$\frac{2x}{2} = \frac{2}{2}$

$\sqrt{x} = 1$



$$3x^2 + 15 = 0$$

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Rookie: pg. 551 # 8-11

Veteran: pg. 551 # 23-25

All Star: pg. 551 # 40, 41

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Can we ever have a parabola open sideways?

Why or why not?

Is the graph described even a function?

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