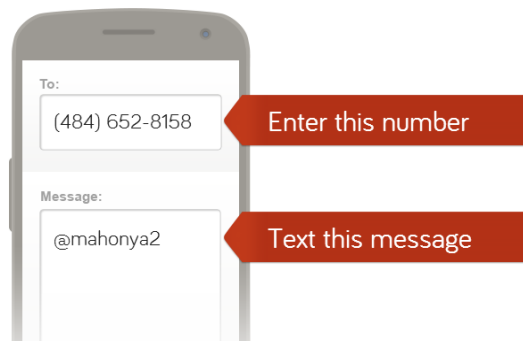


LESSON 4-1 Graphing Quadratic Functions

Part 2
9/10/13
9/11/13

I can... find and interpret maximum and minimum values by graphing.

Remind 101
Ms. Mahony's Alg 2



Homework Questions

? ? ? ?

$$f(x) = x^2 - 4x + 4$$

$$a=1 \quad b=-4 \quad c=4$$

$$(0, 4)$$

$$x = \frac{4}{2} = 2$$

$$f(2) = (2)^2 - 4(2) + 4$$

$$4 - 8 + 4$$

$$(2, 0) = 0$$

$$f(1) = 1^2 - 4(1) + 4$$

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

$$f(x) = -x^2 - 4x + 12$$

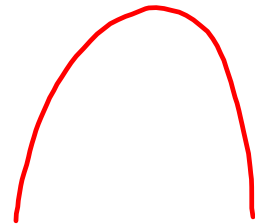
$$f(-2) = -(-2)^2 - 4(-2) + 12$$

$$= -4 + 8 + 12$$

$$16$$

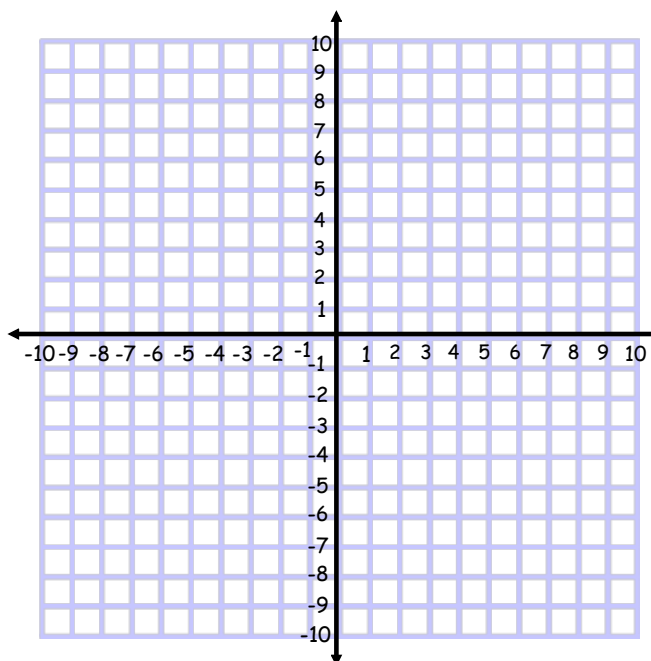
$$x = \frac{4}{-2} = -2$$

$$\# (-2, 16)$$



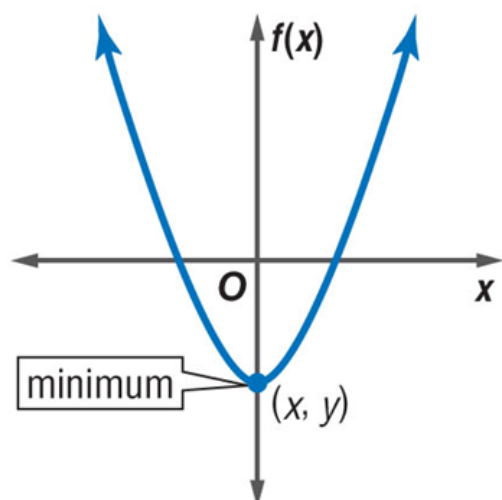
Stick Quiz

Graph $f(x) = 4x^2 - 8x - 1$ by making a table of values. Label the AOS, vertex, and y-intercept.

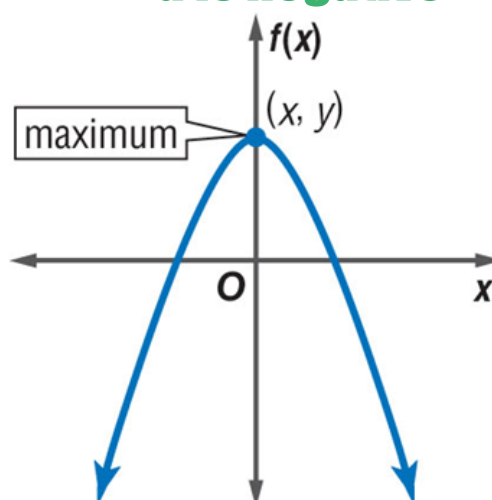


Maximum and Minimum Values

a is positive



a is negative



The y coordinate is your Minimum or Maximum Value

$f(x) = -x^2 + 2x + 3$. Determine whether the function has a maximum or a minimum value. State what it is.

$$\cap a = -1 \quad b = 2 \quad c = 3$$

$$\text{max at } \underline{4} \quad f(1) = -(1)^2 + 2(1) + 3$$

$$= -1 + 2 + 3$$

$$4$$

$$x = \frac{-b}{2a} = \frac{-2}{2(-1)} = 1$$

domain and range??

Domain: \mathbb{R}

Range: $y \leq 4$

7. $f(x) = x^2 + 4x - 1$. Determine whether the function has a maximum or a minimum value. State what it is.

domain and range??

\cup min at -5

D: \mathbb{R}

R: $y \geq -5$

Balls, Arrows, Missiles and Stones

If you throw a ball (or shoot an arrow, fire a missile or throw a stone) it will go up into the air, slowing down as it goes, then come down again ...

... and a [Quadratic Equation](#) tells you where it will be!



In many quadratic max/min problems, you'll be given the formula you need to use.

Don't try to figure out where they got it from. Just find the vertex.

Then interpret the variables to figure out which number from the vertex you need, where, and with what units.

Throwing a Ball

A ball is thrown straight up, from 3 m above the ground, with a velocity of 14 m/s. What is the maximum height?

(Hint: Velocity Equation $f(t) = gt^2 + v_0t + h_0$)

\rightarrow -16 or -4.9 \leftarrow Initial Velocity
 Initial Height

$$f(t) = -4.9t^2 + 14t + 3$$

$$x = \frac{-b}{2a} = \frac{-14}{2(-4.9)} = 1.429$$

$$-4.9(1.429)^2 + 14(1.429) + 3$$

If a toy rocket is launched vertically upward from ground level with an initial velocity of 128 feet per second, then its height h after t seconds is given by the equation below (if air resistance is neglected).

$$h(t) = -16t^2 + 128t$$

1. How long will it take the rocket to hit its maximum height?
2. What is the maximum height?

You and a friend are hiking in the mountains. You want to climb to a ledge that is 20 ft. above you. The height of the grappling hook you throw is given by the function below.

$$h(t) = -16t^2 - 32t + 5$$

1. What is the maximum height of the grappling hook?
2. Can you throw it high enough to reach the ledge?

One of the games at a carnival involves trying to ring a bell with a ball by hitting a lever that propels the ball into the air. The height of the ball is modeled by the equation

$$h(t) = -16t^2 + 39t$$

If the bell is 25 ft. above the ground, will it be hit by the ball?

Homework 4.1

Finish Worksheet

(skip word problems on WS)

Bk pg 224 # 32, 58, 60