Remember, the vertex of a parabola is either the maximum or the minimum of a quadratic function.

The Max or Min of a function is the y-coordinate at the Vertex.

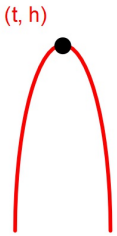
When a Max or Min occurs is the x-coordinate of the Vertex.

In other words, WHAT a function equals is a y-value

WHEN something happens is an x-value

A ball is shot into the air with an initial velocity of 80 ft/sec from the top of a 50 ft tall building. The following equation models the height (ft) of the object as a function of time (sec).

$h(t) = -16t^2 + 80t + 50$



1. Find the time it takes the object to reach its maximum height.

time to max height is the LOS: $t = \frac{-80}{2(-16)} = 2.5$ sec

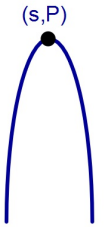
2. Find the maximim height of the object.

Max height = h(2.5) = 150 feet.

Max ht is 150 feet.

A company makes syringes. The following equation models their Profit as a function of the number of syringes made per hour.

$P(s) = -0.45s^2 + 360s - 1250$



1. Find the number of syringes that should be made per hour in order to maximize the company's Profit.

syringes at Max is the LOS: $s = \frac{-360}{2(-.45)} = 400$

2. What is the maximum Profit?

Max Profit = P(400) = 70,750

Max Profit = 70,750

A company needs to minimize their costs. The equation below gives their weekly costs (C) as a function of the number of hours each employee works (h).

$$C(h) = 6.5h^2 - 455h + 7962.50$$

Find the minimum costs the company can incur and how many hours each employee should work to reach this minimum.

hours at Min is the LOS: $h = \frac{455}{2(6.5)} = 35$

Minimum Costs = C(35) = 0

A company wants to maximize their production. The following equation models the number of pieces they can produce as a function of the number of workers that they have working on a shift.

$$P(w) = -0.9w^2 + 45w + 75$$

a) Find the company's maximum production.

replace w with the LOS value of 25: P(25)= 637.5 this is the max production

b) Find the number of workers that are needed for this maximum production.

Find the w coordinate of the vertex using LOS: $w = \frac{-45}{2(-0.9)} = 25$

25 workers will produce the max production

Use this Quadratic Function $f(x) = 2x^2 - 3x + c$

This quadratic passes through the point (-1,13). substitute these values of x and y into the equation and solve for c.

x y

Find c.

$13 = 2(-1)^2 - 3(-1) + c$

$13 = 2 + 3 + c$

$13 = 5 + c$

$-5 \quad -5$

$8 = c$

Find the quadratic function $y = ax^2 + c$ that passes through the given points:

(2, -9) and (-3, -34)

Create two equations by substituting the x and y values from the points into the equation. Then solve this system of equations for a and c.

$-34 = 9a + c$

$-9 = 4a + c$

You can subtract to eliminate c

$-25 = 5a$

$a = -5$

substitute this value of a into one of the equations and solve for c.

$-9 = 4(-5) + c$

$-9 = -20 + c$

$c = 11$

You can now finish Hwk #6 Sec 5-2

Page 248

Due tomorrow

Problems 28-30, 46, 48, 54