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

1. Use this Quadratic: $y = 2x^2 + 24x - 19$

a. Find the Coordinates of the Vertex.

LOS $x = \frac{-24}{4} = -6$

$(-6, -91)$

b. What is the Minimum of this function?

-91

c. When does the minimum occur? when $x = -6$

2. Use this quadratic: $y = -0.25x^2 - 17x + 3$

LOS $\frac{17}{-.5}$

$x = -34$

Vertex: $(-34, 292)$

What is the maximum of this function?

the max of this function is the y-coord at the Vertex

292

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).

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

this indicates we are looking for the Vertex

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

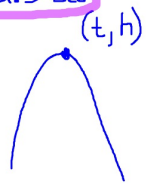
this is the x-coord of the vertex: LOS = $\frac{-80}{2(-16)}$ $t = 2.5$ sec

2. Find the maximim height of the object.

this is the y-coord of the vertex

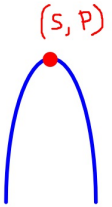
$h(2.5) = -16(2.5)^2 + 80(2.5) + 50 = 150$

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.

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



Vertex!

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

this is the x-coord of the vertex: LOS = $\frac{-360}{2(-.45)}$

syringes to make max profit is 400

2. What is the maximum Profit?

$P(400) = -0.45(400)^2 + 360(400) - 1250$

this is the y-coord at the vertex:

Max Profit = 70,750