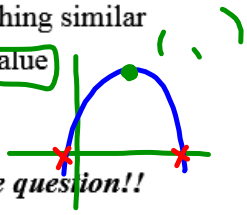
MCF3MI **Unit 3 Day 8** **Solving Problems Involving Quadratic Functions**

When solving word problems, you need to determine what the question is asking you to find.

- A value when a variable is substituted in
- Zeros/x-intercept – usually when an object reaches the ground or something similar
- Vertex – usually when the question asks for a maximum or minimum value

Then use the appropriate strategy to answer the question.



When writing your conclusion, use only the solution that makes sense for the question!!

Example 1:

A computer software company models the profit on its latest video game using the function $P(x) = -2x^2 + 32x - 110$, where x is the number of games, in thousands, that the company produces and $P(x)$ is the profit, in millions of dollars. What is the maximum profit possible and how many video games to they need to sell to earn this profit?

vertex!

$0 = -2x^2 + 32x - 110$

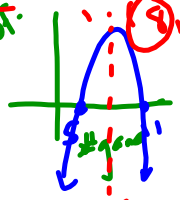
$0 = -2(x^2 - 16x + 55)$

$0 = -2(x-11)(x-5)$

$x-11=0$ $x=11$

$x-5=0$ $x=5$

prof.



x value of vertex $= \frac{5+11}{2}$

$x = 8$

sub $x=8$ into $P(x)$

$P(8) = -2(8)^2 + 32(8) - 110$

$= -2(64) + 256 - 110$

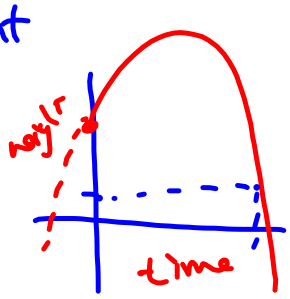
$= 18$

∴ the max profit is $18 million when they sell 8000 games.

Example 2:

Sally is standing on the top of a river slope and throws a ball. The height of the ball at a given time is modelled by the function $h(t) = -5t^2 - 10t + 250$ where $h(t)$ is the height in metres and t is the time in seconds. When will the ball be 10m above the ground?

height



$10 = -5t^2 - 10t + 250$

$0 = -5t^2 - 10t + 250 - 10$

$0 = -5t^2 - 10t + 240$

$0 = -5(t^2 + 2t - 48)$

$0 = -5(t+8)(t-6)$

$t = -8$ $t = 6$

t can't be negative

∴ It will be 10m above the ground at 6 sec.

Homework: Pg. 168 #2, 4, 6, 8, 9, 10