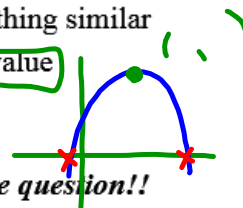


When solving word problems, you need to determine what the question is asking you to find.

- 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 do they need to sell to earn this profit?

Handwritten work for Example 1:

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

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

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

From the factored form, $x - 11 = 0 \Rightarrow x = 11$ and $x - 5 = 0 \Rightarrow x = 5$.

A hand-drawn graph of the parabola $P(x) = -2x^2 + 32x - 110$ is shown. The vertex is labeled with a green arrow and the word 'vertex'. The vertex coordinates are written as $(8, 18)$. The x-intercepts are labeled $x = 5$ and $x = 11$. The y-intercept is labeled $y = -110$.

Sub $x = 8$ into $P(x)$:

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

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

$$= 18$$

\therefore 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?

Handwritten work for Example 2:

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

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

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

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

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

From the factored form, $t + 8 = 0 \Rightarrow t = -8$ and $t - 6 = 0 \Rightarrow t = 6$.

A hand-drawn graph of the parabola $h(t) = -5t^2 - 10t + 250$ is shown. The vertex is labeled with a green arrow and the word 'height'. The x-axis is labeled 'time' and the y-axis is labeled 'height'. The parabola crosses the x-axis at $t = -8$ and $t = 6$. A horizontal dashed line is drawn at $h(t) = 10$, intersecting the parabola at two points.

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

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

t can't be negative