

# Lesson 3.2.2

Saturday, February 4, 2017 4:39 PM

PREC 11

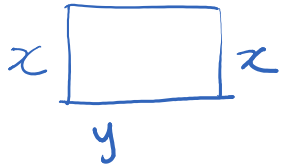
3.2 (cont.) Analyzing a Quadratic Function

Quadratic functions can be applied to real situations (eg. Projectile motion). It also occurs in a situation where a quantity is the product of two other quantities, one increasing and one decreasing.

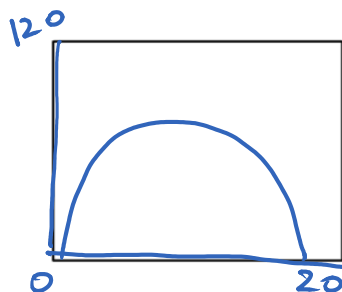
**Example 1:** There are 40 m of fencing to enclose a rectangular pen.

a. Represent the area of the pen as a function of the length of one side of the pen.

$y = 20 - x \rightarrow 2x + 2y = 40$   
 $2y = 40 - 2x$   
 $y = 20 - x$   
 $\text{Area} = l \cdot w = x(20 - x) = 20x - x^2$



b. Graph the function.



Window

$$\begin{cases} x: [0, 20, 1] \\ y: [0, 120, 1] \end{cases}$$

$\uparrow \quad \uparrow \quad \uparrow$   
 min max scale

# Must give the window

c. What dimensions provide an area greater than  $90 \text{ m}^2$ ?

$\text{Area } 90 \text{ m}^2 \rightarrow y = 20x - x^2$   
 $y_1 = 20x - x^2$   
 $y_2 = 90$

use **[CALC]**: 5:Intersect.

$\therefore$  when width is between 6.84m and 13.16m, the area is greater than  $90 \text{ m}^2$ .

**Example 2:** A stone is dropped from a bridge over the Peace River. The height of the stone,  $h$  metres, above the river,  $t$  seconds after it was dropped, is modeled by

$$h = 20 - 4.9t^2 \quad \rightarrow \text{graph on calc: } y = 20 - 4.9x^2$$

a. Graph the function.



b. When did the stone hit the river?

hits river when height is zero.  
(when  $y = 0 \Rightarrow$  find  $x$ -int.)

Calc 2: zero

$$x = 2.02$$

$\therefore$  hits water at 2.02 seconds.

c. What is the domain? What does it represent?

On calculator domain is  $\in \mathbb{R}$   
BUT in this situation we have  
specific domain

$$\therefore \text{Domain: } 0 \leq t \leq 2.02$$

Assignment: pg. 175 #7, 9, 11, 12, 14, 17, 26

22, 23

P. 177 #16 Discuss