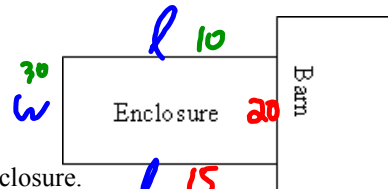


3.6.1 Homework Corrections

Return

2. A farmer needs to enclose a rectangular area using 50 m of fencing. One of the sides of the enclosure is against the barn. If the area of the enclosure is 300m^2 , determine the dimensions of the enclosure.



Let $l + w$ represent the length + width respectively in m.

$$A = lw \quad 2l + w = 50$$

$$300 = lw \quad w = 50 - 2l$$

$$300 = l(50 - 2l)$$

$$300 = 50l - 2l^2$$

$$2l^2 - 50l + 300 = 0$$

$$2(l^2 - 25l + 150) = 0$$

$$2(l - 10)(l - 15) = 0$$

$$\therefore l = 10 \text{ or } l = 15$$

if $l = 10\text{ m}$

$$\text{then } w = 50 - 2(10) \\ = 30\text{ m}$$

if $l = 15\text{ m}$

$$\text{then } w = 50 - 2(15) \\ = 50 - 30 \\ = 20\text{ m}$$

the dimensions of the enclosure are 10 m by 30 m, **OR** 15 m by 20 m.

3. The function, $h = t^4 - 2t^3 - t + 2$, models the path of a seagull trying to catch fish, where h represents the seagull's height above the water in metres and t represents the time in seconds.
- At what height is the seagull when it first sees the fish?
 - When does the seagull hit the water?
 - At what time does the seagull leave the water with the fish in its beak?

$$a) h(t) = t^4 - 2t^3 - t + 2$$

$$\text{if } t=0, h(t) = 2$$

\therefore the seagull is 2 m above the water.

$$b) \text{ when } h=0 \text{ or let } h(t) = 0$$

$$0 = t^4 - 2t^3 - t + 2$$

$$= t^3(t-2) - 1(t-2)$$

$$= (t-2)(t^3 - 1)$$

$$t-2 = 0$$

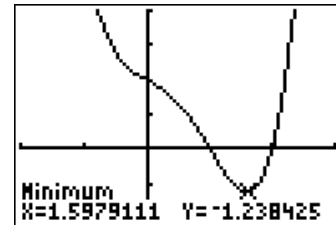
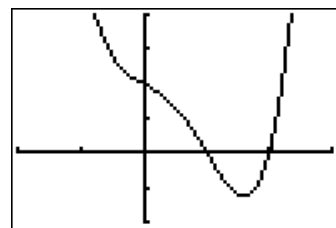
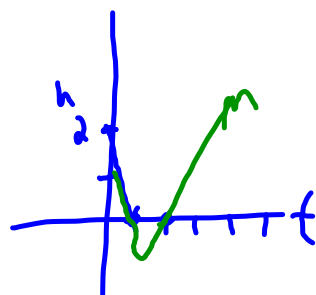
$$t = 2$$

$$\hookrightarrow t^3 - 1 = 0$$

$$t^3 = 1$$

$$t = \sqrt[3]{1}$$

the seagull hits the water at 1 second (and leaves the water at 2 seconds).



4. Melissa is running a ski trip during the exam break.
 The bus holds 40 students and if she charges \$250 per student the bus will be filled.
 For every \$25 increase in the price she charges students, two fewer students will go on the trip.
 a) Write an equation to model the Melissa's revenue.
 b) Determine the maximum revenue.
 c) How many students need to go on the trip for Melissa to earn \$8800?

Return

a) Revenue = price \times number of tickets
 $= p(-0.08p + 60)$
 $= -0.08p^2 + 60p$

b) $R = -0.08p^2 + 60p$
 $= -0.08p(p - 750)$
 \checkmark or $p = 750$
 $p = 0$
 $x = \frac{-b}{2a}$

$= 40 - 2 \left(\frac{p - 250}{25} \right)$
 $= 40 - \frac{2}{25}(p - 250)$
 $= 40 - \frac{2}{25}p + 20$
 $= -\frac{2}{25}p + 60$
 $= -0.08p + 60$

the max. revenue would occur when ticket price is set at \$375
 (the max. revenue would be \$11250, from 30 tickets being sold. $11250 \div 375 = 30$)

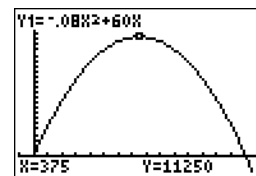
c) $8800 = -0.08p^2 + 60p$

$0.08p^2 - 60p + 8800 = 0$

$0.08(p^2 - 750p + 11000) = 0$

$0.08(p - 550)(p - 200) = 0$

$p = 550$ or $p = 200$



to earn a revenue of \$8800, ticket price must be set at \$550

(resulting in only 16 tickets being sold $8800 \div 550 = 16$)

or the ticket price must be set at \$200

(resulting in 44 tickets needing to be sold $8800 \div 200 = 44$)

[What is the problem with this idea?]

Melissa is best off setting the price at \$375

