Are there any Homework Questions you would like to see on the board?

pp. 214-215 # 6f, 7f, 10, 11 **AND**
READ p. 225 **AND**
p.226 # 1-11

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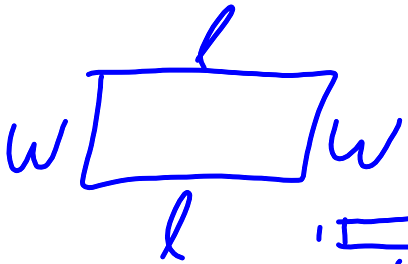
Today's Learning Goal(s):

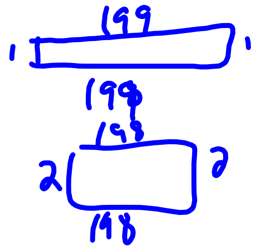
By the end of the class, I will be able to:

a) Solve problems involving quadratic functions and equations arising from standard and vertex form.

p.226 # 7

7. A police officer has 400 m of yellow tape to seal off the area of a crime scene. What is the maximum area that can be enclosed?





$P = 2l + 2w$

$400 = 2l + 2w$

$400 - 2w = 2l$

$200 - w = l$

$A = lw$

$= (200-w)w$

$= 200w - w^2$

$= -w^2 + 200w$

$= -(w^2 - 200w)$

$= -(w^2 - 200w + 10000 - 10000)$

$= -(w-100)^2 + 10000$

$\therefore$ the max. area is 10 000 m^2

[and occurs when the width is 100 m]

$\therefore l = 200 - w$

$= 200 - 100$

$= 100$

$\therefore$ 100m by 100m

[a square]

MCF 3MI

4.5 Using Quadratic Function Models to Solve Problems

Date: Apr. 6/18

Ex. 1: The cost of running an assembly line is a function of the number of items produced per hour. The cost function is, $C(x) = 0.28x^2 - 1.12x + 2$

where $C(x)$ is the cost per hour in thousands of dollars,
and x is the number of items produced per hour, in thousands. (p.237 Ex.3)
Determine the most economical production level.

$$C(x) = 0.28x^2 - 1.12x + 2$$
$$= 0.28(x^2 - 4x) + 2$$
$$= 0.28(\underbrace{x^2 - 4x + 4} - 4) + 2$$
$$= 0.28(x-2)^2 + 0.28(-4) + 2$$
$$= 0.28(x-2)^2 - 1.12 + 2$$
$$= 0.28(x-2) + 0.88$$

(in thousands)

$\therefore$ the most economical production level is 2 000 items per hour.

Ex. 2: A bus company usually charges \$2 per ticket, but wants to raise the price by 10 cents per ticket. The revenue that could be generated is modelled by the function,

$$R(x) = -40(x-5)^2 + 25000$$

where x is the number of 10 cent increases and the revenue, $R(x)$, is in dollars. What should the price of the tickets be if the company wants to earn \$21 000? (p.238 Ex.4)

$R(x) = 21000$

$\therefore 21\,000 = -40(x-5)^2 + 25000$

$0 = -40(x-5)^2 + 25000 - 21000$

$0 = -40(x-5)^2 + 4000$

$21000 - 25000 = -40(x-5)^2$

$-4000 = -40(x-5)^2$

$\frac{-4000}{-40} = (x-5)^2$

$100 = (x-5)^2$

$\pm\sqrt{100} = \sqrt{(x-5)^2}$

$\pm 10 = x - 5$

$5 \pm 10 = x$

$\therefore x = 5 + 10$ or $x = 5 - 10$

$= 15$ $\qquad = -5$

$\therefore$ 15 increases of 10¢ each.

(−5 increases does not make sense)

$\therefore$ \$1.50 increase in price

$\therefore$ New price $= \$2 + \$1.50$

$= 3.50$

$\therefore$ the new ticket price should be \$3.50

Today's Homework:

pp. 239-241 # 2, 4 – 8, 13 **AND**

READ p. 253 **AND**

Work ahead on Review: pp. 254-255 # 1 – 10