

## 3.2 Determining Max and Min Values of a Quadratic Function

### Today's Learning Goal(s):

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

- a) determine the maximum or minimum values of a quadratic function in two different ways.

## 3.2 Determining Maximum and Minimum Values of a Quadratic Function

Date: \_\_\_\_\_

### Ex. 1: Maximizing Profit

The demand function for a new product is  $p(x) = -5x + 44$ , where  $p(x)$  represents the selling price of the product and  $x$  is the number sold in thousands. The cost function is  $C(x) = 4x + 30$ .

Calculate the quantity of items sold that will produce the maximum profit.

REVENUE = PRICE (NUMBER SOLD) $R(x) = [p(x)](x)$
PROFIT = REVENUE – COST $P(x) = R(x) - C(x)$

WIK: selling price formula is  $p(x) = -5x + 44$

cost formula is  $C(x) = 4x + 30$

$x$  represents the number of items sold, **in thousands**

WINTK: I need to find maximum profit using the formula  $P(x) = R(x) - C(x)$

But, first I need to find the revenue using the formula  $R(x) = [p(x)](x)$

PLAN:

1. find revenue
2. find profit
3. find maximum profit by completing the square
4. concluding sentence

$$R(x) = [p(x)](x)$$

$$R(x) = [-5x + 44](x)$$

$$= -5x^2 + 44x$$

$$P(x) = R(x) - C(x)$$

$$= -5x^2 + 44x - (4x + 30)$$

∴ the maximum profit is \_\_\_\_\_ when \_\_\_\_\_ items are sold.

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Ex. 2: Find the minimum for the function  $y = 2x^2 - 8x - 42$ .

a)

b)

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Ex. 3: For the function  $f(x) = 3x^2 - 2x - 5$  find:

a) the  $x$ -intercepts

let  $f(x) = 0$

Pull

b) the maximum or minimum value  
(use 1/2 way method for  $x$ -intercepts above)

\*for the complete the square method, pull the tab below

Pull

Therefore the minimum value is  $-\frac{16}{3}$  which occurs when  $x = \frac{1}{3}$ .

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Ex. 4: Find the maximum or minimum value for the function

$$h(x) = -2x^2 + 10x + 55$$

*Yay!! for fractions!*

