

## General Algebra 2 Worksheet #3 Unit 9 Selected Solutions

A company produces garden tools. They estimate that their daily profit,  $P$ , (in dollars) depends on the number of tools,  $n$ , they produce per day according to the function  $P(n) = -.01n^2 + 8n - 700$ .

7. How many garden tools should they produce per day in order to get a maximum profit? What is the maximum profit? (I have shown 2 methods of solution for this problem.)

Find the vertex:

At the vertex,  $n = -B/2A$ .

$$n = -8/(-.02) = 400$$

The maximum profits is

$$P(400) = -.01(400)^2 + 8(400) - 700$$

$$P(400) = 900$$

$$P + 700 = -.01(n^2 - 800n)$$

$$P + 700 - 1600 = -.01(n^2 - 800n + 160,000)$$

$$P - 900 = -.01(n - 400)^2$$

The vertex is (400, 900).

They should produce 400 tools per day.

The maximum profit is \$900 per day.

8. What value(s) of  $n$  correspond to 'break even' points ( $P = 0$ )?

Find  $n$  if  $P = 0$ .

$$0 = -.01n^2 + 8n - 700$$

$$0 = n^2 - 800n + 70,000$$

$$0 = (n - 100)(n - 700)$$

$$n = 100 \text{ or } n = 700$$

They will break even if  $n = 100$  or  $n = 700$ .

9. How much money will they lose per day if  $n = 0$ ?

Find  $P$  if  $n = 0$ .

$$P = -.01n^2 + 8n - 700$$

$$P = -700$$

They will lose \$700 per day if  $n = 0$ .