

## QUIZ

SHOW ALL WORK AND JUSTIFY ALL ANSWERS.

$$a = .5 \quad b = 2 \quad c = -1$$

1. Consider the function  $f(x) = 0.5x^2 + 2x - 1$ .(a) (1 point) Find the vertex:  $(-2, -3)$ 

$$\text{Vertex: } x = \frac{-b}{2a} = \frac{-2}{2(.5)} = -2$$

$$f(-2) = .5(-2)^2 + 2(-2) - 1 = -3$$

2nd Calc Min

(b) (1 point) Does the vertex occur at a maximum or minimum?

2. Suppose a company has a price-demand function of  $p(x) = -0.05x + 55$ ,  $0 \leq x \leq 1100$ , where  $x$  is the number of items and  $p(x)$  is the price per item (in dollars), compute demand ( $x, p$ ) (# of items, \$/item)

(a) (2 points) the revenue function of the sale of  $x$  items.

$$R(x) = x(\text{demand}) = x(-.05x + 55) = -.05x^2 + 55x$$

(b) (2 points) the number of items sold when  $R(x)$  is maximized. Include units.

549.99975, 15125  $\Rightarrow$  (550, 15125) is point on calculator

550 items

(c) (2 points) the maximum revenue. Include units.

$$\$15,125$$

(d) (2 points) the price per item when revenue is maximized. Include units.

use price-demand fcn:  $p(x) = -.05x + 55$

plug in  $x$ -value where revenue was maximized

$$p(550) = -.05(550) + 55 = 27.5$$

price per item: \$27.50

or  $\frac{\$ \text{ max revenue}}{\text{qty that gave max revenue}}$