

3) Graph the following parabola. Be sure to include an accurate vertex and accurate intercepts.

$$f(x) = -x^2 + x + 2$$

$$\text{Vertex } -\frac{b}{2a} = -\frac{1}{-2} = \frac{1}{2}$$

$$k = -\left(\frac{1}{4}\right) + \frac{1}{2} + 2$$

$$= 2.25$$

$$(.5, 2.25)$$

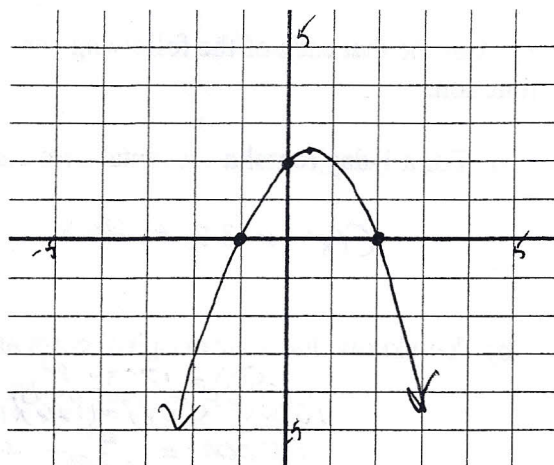
intercepts

$$-x^2 + x + 2 = 0$$

$$0 = x^2 - x - 2$$

$$0 = (x-2)(x+1)$$

$$x = 2, x = -1$$



4) Without graphing determine if the following parabola opens up or down and find its vertex.

$$f(x) = 0.2x^2 + 0.4x + 0.1$$

up

$$-\frac{b}{2a} = \frac{-0.4}{0.4} = -1$$

$$k = (0.2 - 0.4 + 0.1) =$$

$$(-1, -0.1)$$

5) Suppose that the supply and demand curves for a certain product are given by

$$\text{Supply: } p = 80q \text{ and Demand } p = -q^2 + 2000$$

a) How many are demanded at a price of \$20

$$20 = -q^2 + 2000$$

$$q^2 = 1980$$

$$q = 44.497 \rightarrow 44.5$$

b) How many are supplied at a price of \$20.

$$20 = 80q$$

$$\frac{1}{4} = q$$

c) Find the equilibrium quantity and the equilibrium price.

$$80q = -q^2 + 2000$$

$$q^2 + 80q - 2000 = 0$$

$$(q-20)(q+100) = 0$$

$$q = 20$$

$$p = 1600$$