5. Consider the curve y = x^2 -3x +2.
(a) Sketch the curve over the range x = 0 to x = 3.
(b) Evaluate the area bounded by the curve and the x-axis between the limits x=0 and x=1.

a)

The graph of this quadratic equation will be a parabola. Since the coefficient of the x^2 term is positive, the parabola will open toward the top.

The solutions to $x^2 – 3x + 2 = 0$ are:

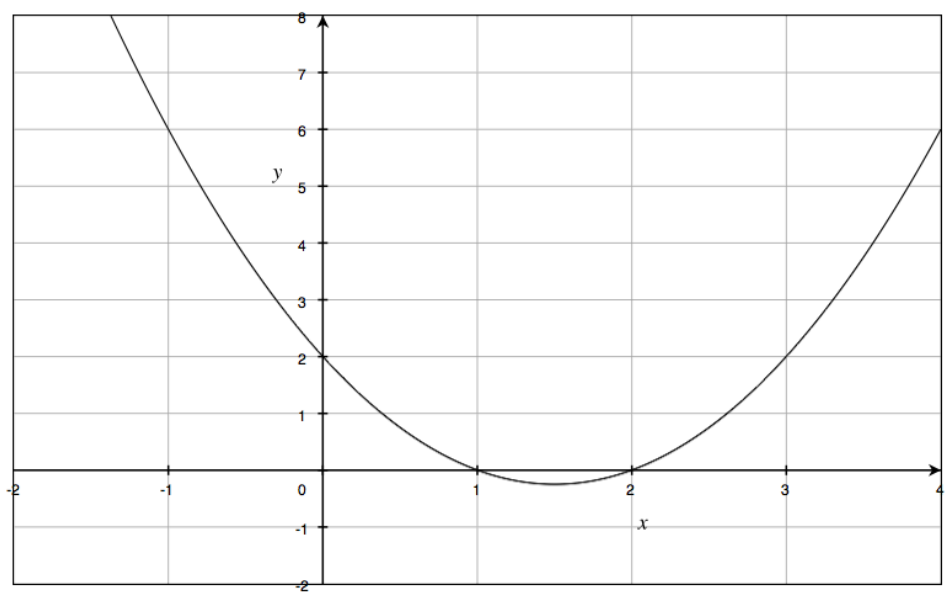
$$x^2 - 3x + 2 = 0$$
$$(x - 2)(x - 1) = 0$$
$$x - 2 = 0 \qquad x - 1 = 0$$
$$x = 2 \qquad x = 1$$

So the x-intercepts are (2, 0) and (1, 0).

The x-coordinate of the vertex of the parabola is x = -b/2a = -(-3) / 2 = 3/2.
The y-coordinate of the vertex is then $(3/2)^2 – 3(3/2) + 2 = -1/4$

The vertex is located at (3/2, -1/4)

The curve looks like this:



(b) Evaluate the area bounded by the curve and the x-axis between the limits x=0 and x=1.

$$\int_0^1 x^2 - 3x + 2 \ dx = \left[\frac{1}{3}x^3 - \frac{3}{2}x^2 + 2x\right]_0^1$$

$$= \frac{1}{3}(1)^3 - \frac{3}{2}(1)^2 + 2(1)$$

$$= \frac{1}{3} - \frac{3}{2} + 2$$

$$= \frac{5}{6}$$