

## QUADRATIC FUNCTIONS [2nd Degree Polynomials]

### Standard Form

$$y = a(x-h)^2 + k$$

$$y = (x+1)^2 - 4$$

### Quadratic Form

$$y = Ax^2 + Bx + C$$

$$y = x^2 + 2x - 3$$

STEP 1: Find the Vertex

(h,k)

(-1,-4) vertex

$$x\text{-value of vertex} = \frac{-b}{2a} = \frac{-2}{2 \cdot 1} = \frac{-2}{2} = -1$$

$$y = (-1)^2 + 2(-1) - 3 =$$

$$= 1 - 2 - 3$$

$$= -4$$

(-1,-4) vertex

STEP 2: Find the y-intercept [f(0)]

$$y = (0+1)^2 - 4$$

$$y = (1)^2 - 4$$

$$y = -3$$

(0,-3) y-intercept

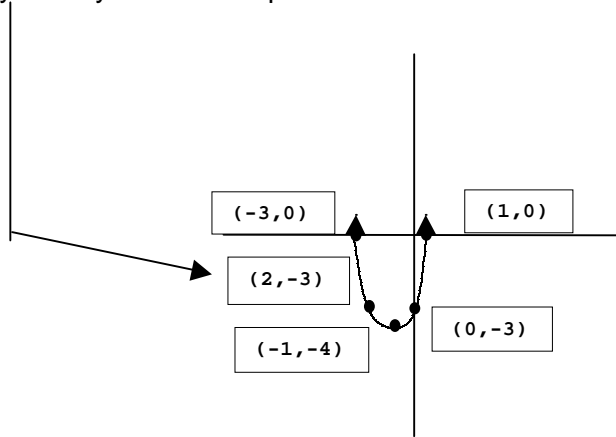
$$y = x^2 + 2x - 3 \text{ the constant is the y-intercept}$$

$$y = (0)^2 + 2(0) - 3$$

$$y = -3$$

(0,-3) y-intercept

STEP 3: Use symmetry to find third point.



STEP 4: Find x-intercepts if there are any [f(x)=0].

$$(x+1)^2 - 4 = 0$$

$$(x+1)^2 = 4$$

$$\sqrt{(x+1)^2} = \sqrt{4}$$

$$x + 1 = \pm 2$$

$$x = -1 \pm 2$$

$$x = -1 + 2 \text{ or } x = -1 - 2$$

$$x = 1 \text{ or } x = -3$$

(1,0), (-3,0)

$$x^2 + 2x - 3 = 0$$

$$(x-1)(x+3) = 0$$

$$x-1 = 0$$

$$x+3 = 0$$

$$x = 1$$

$$x = -3$$

(1,0) (-3,0)

(1,0), (-3,0)