Let F be a point in the plane and d be a line not containing F. A **parabola** is the set of all points equidistant from F and d. The point F is called the focus of the parabola abd the line d is called the directrix of the parabola.



Ex 1) Write each function in standard form of a quadratic by completing the square method.

a)
$$y = x^2 - 6x + 3$$

b) $y = -x^2 - 8x - 11$

c)
$$y = -2x^2 - 8x - 1$$

d) $y = 3x^2 - 9x + 6$

Ex 2) Find the vertex, focus and directrix of the parabola $y = -\frac{1}{2}x^2$

Ex 3) Find the equation of the parabola with the focus at (-2, 0) and the directrix is x = 2.

Ex 4) Find the equation of the parabola with the focus at (5, 4) and the vertex at (3, 4).

Ex 5) Put the equation $y^2 - 6x + 2y + 13 = 0$ in vertex form. Find the vertex, focus and directrix of the parabola. Sketch the graph.

Ex 6) Find the equation in standard form and vertex form of a porabola:

a) F(-4,0) and directrix x = 4.

b) Opens upward, *V*(0, 0), and focal width of 3.

c)
$$F(-5,3)$$
 and $V(-5,6)$.
d) $3x^2 - 6x - 6y + 10 = 0$

Ex 7) Graph: $x + 1 = 4y - y^2$



Ex 8) Graph: $x^2 - 8x - y + 18 = 0$



Ex 9) Write an equation for the parabola with a focus at (-1, 7), the length from the focus to the vertex is 2 units, and has a minimum.