

General Form

Opens up/down

$$x^2 + Dx + Ey + F = 0$$

Opens right/left

$$y^2 + Dx + Ey + F = 0$$

1. Write in standard form

$$2x^2 - 8x + y + 6 = 0$$

$$2x^2 - 8x = -y - 6$$

$$2(x^2 - 4x + 4) = -y - 6 \quad \text{or} \quad x^2 - 4x + 4 = -\frac{1}{2}y - 3 + 4$$

$(-\frac{4}{2})^2 = (-2)^2 = 4$ $+8$ $(-\frac{4}{2})^2 = (-2)^2 = 4$

$$\frac{2(x-2)^2}{2} = \frac{-y+2}{2}$$

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

$$(x-2)^2 = -\frac{1}{2}(y-2)$$

$$(x-2)^2 = 4(-\frac{1}{8})(y-2)$$

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

2. Write in standard form

$$y^2 - 8y - x + 18 = 0$$

$$y^2 - 8y + 16 = x - 18 + 16$$

$$\left(-\frac{8}{2}\right)^2 = (-4)^2 = 16$$

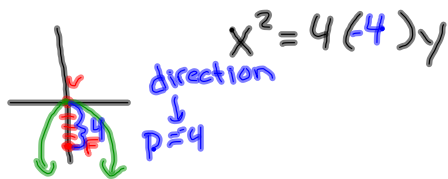
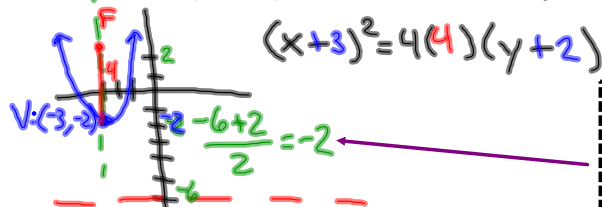
$$(y - 4)^2 = x - 2$$

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

$$(y - 4)^2 = 4\left(\frac{1}{4}\right)(x - 2)$$

Write an equation for the parabola in standard form.

3.) Vertex is at the origin, a focus is at (0, -4)

4.) Focus is at (-3, 2), directrix is at $y = -6$ 

vertex is half way
between the
focus & directrix

Thus we average
the two y-values
to find the vertex

5.) Parabola passes through the point $(9, -2)$, has a vertex at $(5, -1)$ and opens downward. Write the equation in standard form.

$$(x-5)^2 = 4p(y+1)$$

$$(9-5)^2 = 4p(-2+1)$$

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

$$\frac{16}{-4} = \frac{-4p}{-4}$$

$$p = -4$$

$$(x-5)^2 = 4(-4)(y+1)$$