

Continuing from Friday...

5. $-4x + 4 = y^2 + 10y + 25$

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

$$4p = -4$$

$$p = -1$$

Since $p < 0$,
open left

$$X = \frac{1}{4p}(y-k)^2 + h$$

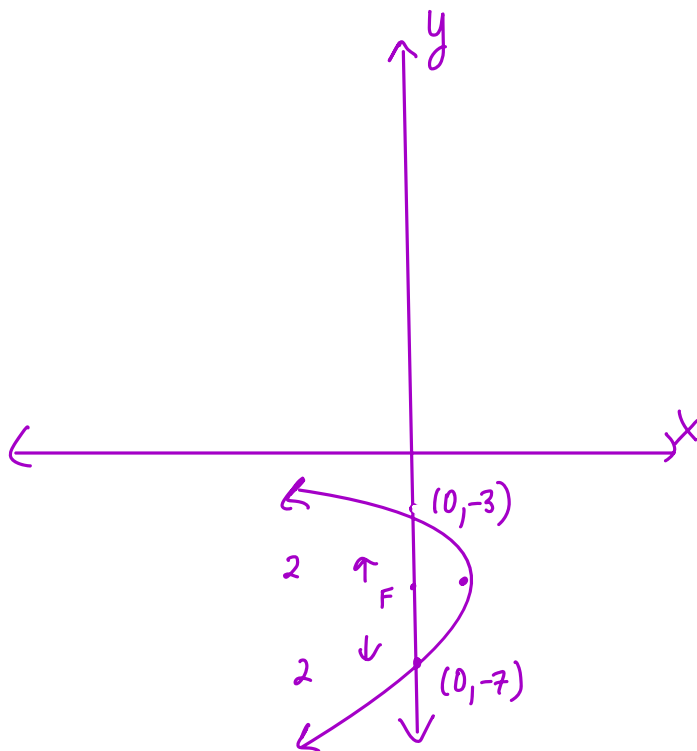
$$4p(x-h) = (y-k)^2$$

Vertex: $(1, -5)$

Focus: $(0, -5)$

Directrix: $X = 2$

Axis of symmetry: $y = -5$



For 7 and 8, identify the vertex, axis of symmetry, directrix, direction of opening of each.

7. $-2x^2 - 4x + y + 70 = 0$

$$y + 70 = 2x^2 + 4x$$

$$y + 70 + 2 = 2(x^2 + 2x + 1)$$

$$y + 72 = 2(x+1)^2$$

$$\frac{1}{2}(y+72) = (x+1)^2$$

$$\frac{1}{2} = 4p$$

$$8p = 1$$

$$p = \frac{1}{8}$$

$$y = \frac{1}{4p}(x-h)^2 + k$$

$$4p(y-k) = (x-h)^2$$

vertex: $(-1, -72)$

axis of symmetry: $X = -1$

directrix: $y = -72 - \frac{1}{8}$

opens up

focus: $(-1, -72 + \frac{1}{8})$



For 9-13, use the information provided to write the equation of the parabola in vertex form.

9. focus: (1,3) and vertex: (1,2)

$$p=1$$

opens up

$$4p(y-k) = (x-h)^2$$

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

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

12. vertex: (-7,9) , opens left or right, and passes through (-4,8)

$$4p(x-h) = (y-k)^2$$

plug in (-4,8) → $4p(x+7) = (y-9)^2$

$$4p(-4+7) = (8-9)^2$$

$$12p = 1$$

$$p = \frac{1}{12}$$

$$4\left(\frac{1}{12}\right)(x+7) = (y-9)^2$$

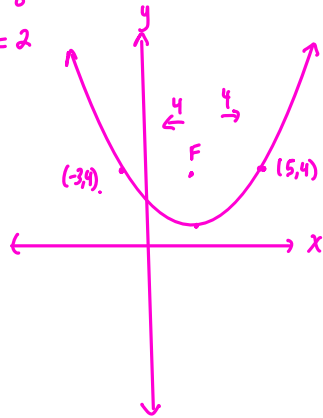
$$\frac{1}{3}(x+7) = (y-9)^2$$

Homework 03-08

3. $x^2 - 2x + 1 = 8y - 16$ *opens up*

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

$$4p = 8$$
$$p = 2$$



Vertex: (1, 2)

Focus: (1, 4)

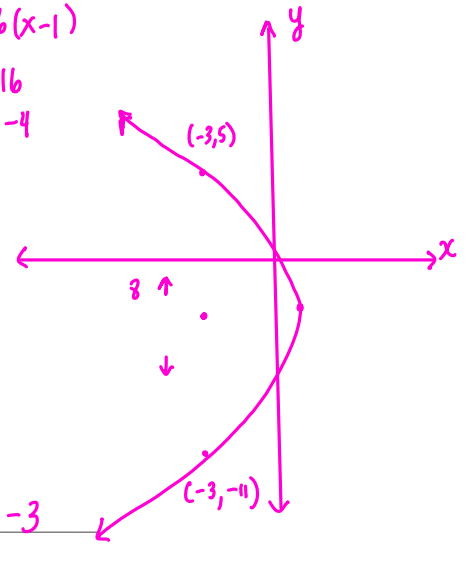
Directrix: y = 0

Axis of symmetry: x = 1

4. $y^2 + 6y + 9 = 16 - 16x$ *opens left*

$$(y+3)^2 = -16(x-1)$$

$$4p = -16$$
$$p = -4$$



Vertex: (1, -3)

Focus: (-3, -3)

Directrix: x = 5

Axis of symmetry: y = -3