

Example 1: Graph $(x-4)^2 = 8(y+3)$

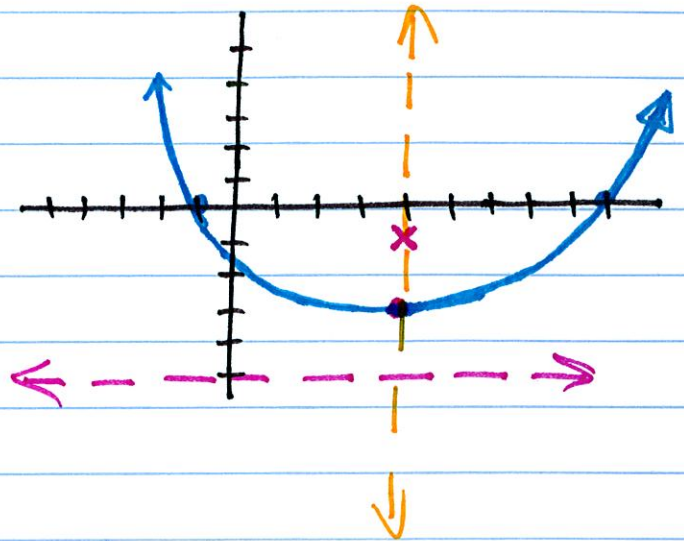
$$4p = 8$$
$$p = 2$$

vertex: $(4, -3)$

focus: $(4, -1)$

directrix: $y = -5$

axis of symmetry: $x = 4$



Example 2: Graph $(y-2)^2 = -20(x-1)$

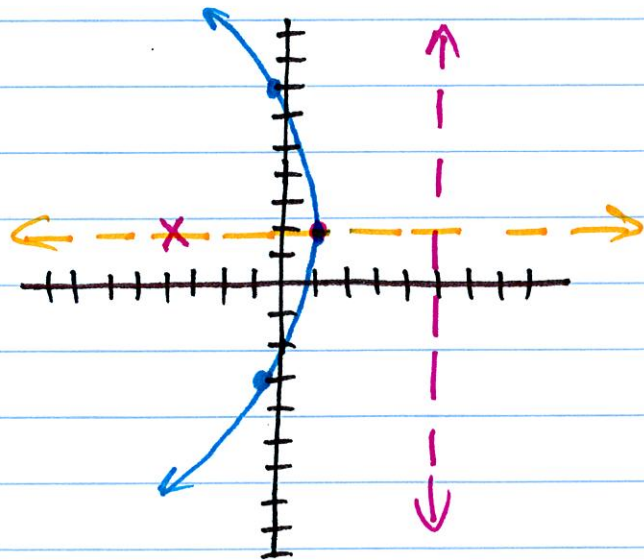
$$4p = -20$$
$$p = -5$$

vertex: $(1, 2)$

focus: $(-4, 2)$

directrix: $x = 6$

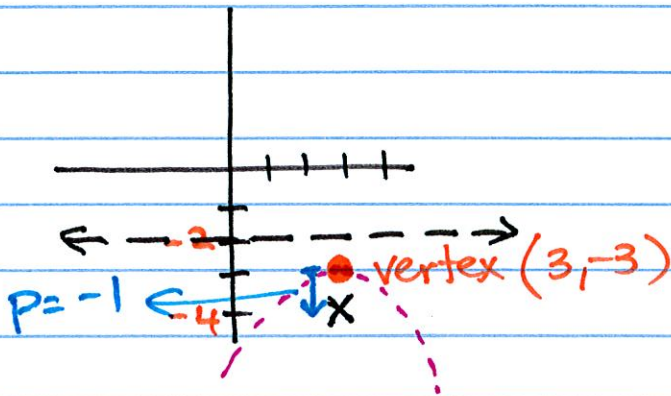
axis of symmetry: $y = 2$



Example 3: Write the equation

(a) Focus: $(3, -4)$
Directrix: $y = -2$

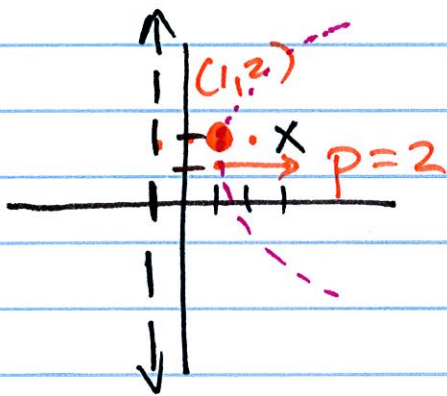
Need to know: vertex (h, k)
 p



$$(x-h)^2 = 4p(y-k)$$
$$(x-3)^2 = 4(-1)(y-(-3))$$

$$(x-3)^2 = -4(y+3)$$

(b) Focus: $(3, 2)$
Directrix: $x = -1$



$$(y-k)^2 = 4p(x-h)$$
$$(y-2)^2 = 8(x-1)$$

Homework: Write the equation

- ① $F = (-4, -4)$; directrix: $y = 0$
- ② $F = (1, -1)$; directrix: $x = -5$
- ③ $F = (-2, -1)$; directrix: $x = 2$
- ④ $F = (-3, 4)$; directrix: $y = -2$
- ⑤ $F = (1, 3)$; directrix: $y = 9$