

CONIC SECTIONS PARABOLAS!

Name Key

Period Date

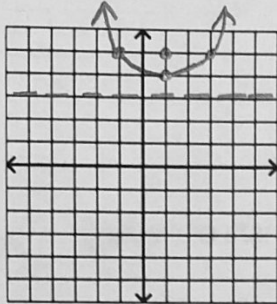
Use simplest radical form where appropriate (no decimals!)

1. Find the vertex, focus, and directrix of each parabola, then graph the parabola.

V a. $(x-1)^2 = 4(y-4)$

up

$4p = 4$
 $p = 1$



vertex: $(1, 4)$

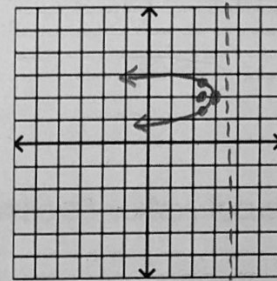
focus: $(1, 5)$

directrix: $y = 3$

H b. $x-3 = -(y-2)^2$

Left

$4p = 1$
 $p = 1/4$



vertex: $(3, 2)$

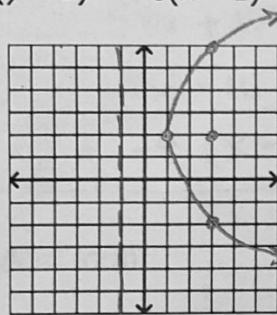
focus: $(1/4, 2)$

directrix: $x = 13/4$

H c. $(y-2)^2 = 8(x-1)$

Right

$4p = 8$
 $p = 2$



vertex: $(1, 2)$

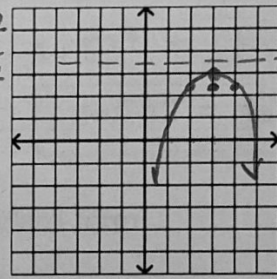
focus: $(3, 2)$

directrix: $x = -1$

V d. $-2(y-3) = (x-3)^2$

Down

$4p = 2$
 $p = 1/2$



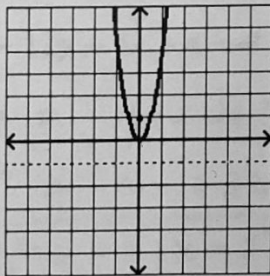
vertex: $(3, 3)$

focus: $(3, 5/2)$

directrix: $y = 7/2$

2. Write the standard form equation of the parabola shown or described.

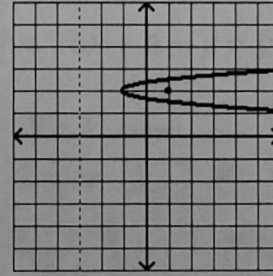
a.



$(x-h)^2 = 4p(y-k)$
 $(x-0)^2 = 4(1)(y-0)$

$x^2 = 4y$

b.



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

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

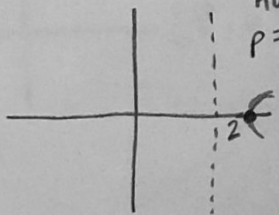
c. Vertex $(10, 0)$; Directrix $x = 8$

Horiz.

$p = 2$

$(y-0)^2 = 4(2)(x-10)$

$y^2 = 8(x-10)$



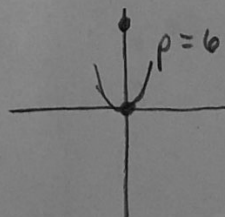
d. Vertex $(0, 0)$; Focus $(0, 6)$

Vertical

$p = 6$

$(x-0)^2 = 4(6)(y-0)$

$x^2 = 24y$



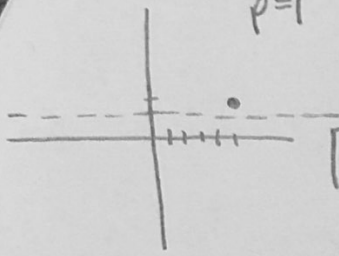
2, continued. Write the standard form equation of the parabola shown or described.

a. Vertex (5, 2); directrix $y = 1$

Vertical

$p = 1$

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

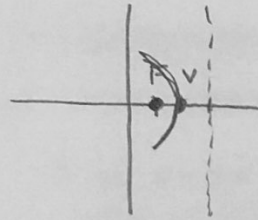


$$(x-5)^2 = 4(y-2)$$

b. Directrix $x = 3$; focus (1, 0)

Horiz.
 $p = 1$

$V(2, 0)$



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

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

3. Convert each equation to standard form, then find the parabola's vertex, focus, & directrix.

a. $y^2 + 8x - 2y - 15 = 0$

$$y^2 - 2y + \underline{1} = -8x + 15 + \underline{1}$$

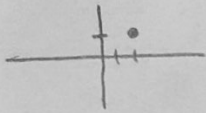
$$(y-1)^2 = -8x + 16$$

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

$$-8 = 4p$$

$$-2 = p$$

standard form:



vertex:
(2, 1)

focus:
(0, 1)

directrix:
 $x = 4$

b. $x^2 + 10x - 6y + 7 = 0$

$$x^2 + 10x + \underline{25} = 6y - 7 + \underline{25}$$

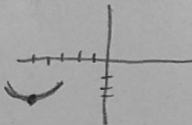
$$(x+5)^2 = 6y + 18$$

$$(x+5)^2 = 6(y+3)$$

$$4p = 6$$

$$p = 3/2$$

standard form:



vertex:
(-5, -3)

focus:
(-5, 3/2)

directrix:
 $y = -9/2$

c. $y^2 - 12y + 4x + 4 = 0$

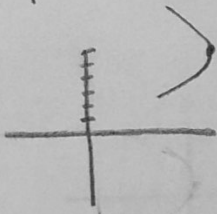
$$y^2 - 12y + \underline{36} = -4x - 4 + \underline{36}$$

$$(y-6)^2 = -4x + 32$$

$$(y-6)^2 = -4(x-8)$$

$p = 1$

standard form:



vertex:
(8, 6)

focus:
(7, 6)

directrix:
 $x = 9$

d. $8x^2 + 16x + 4 - y = 0$

$$8x^2 + 16x + \underline{\quad} = -4 + y + \underline{\quad}$$

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

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

$$4p = 1/8$$

$$p = 1/32$$

standard form:

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

vertex:
(-1, -4)

focus:
(-1, -3 3/32)

directrix:
 $y = -4 1/32$

