Algebra 2 Worksheet
Section 10.5 – Parabolas DAY TWO

Name: _____

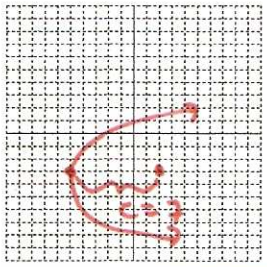
Period: __

I. Write the equation in standard form for each parabola, and give the domain and the range. The graph is provided for you to sketch what is given in order to better write the equation.

1. parabola with its vertex at $(\overset{h}{-5},\overset{k}{-3})$ and its focus at $(2,-3)$

Direction it opens: right
Value of p: $+7$
Equation in Standard Form: $(y+3)^2 = 28(x+5)$
Domain: $x \geq -5$
Range: $\mathbb{R}$

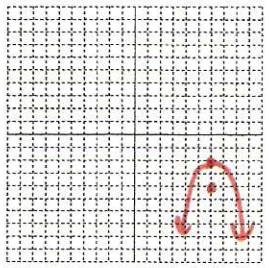
y^2
$(y-k)^2 = 4p(x-h)$



2. parabola with its vertex at $(\overset{h}{6},\overset{k}{-2})$ and its focus at $(6,-4)$

Direction it opens: down
Value of p: -2
Equation in Standard Form: $(x-6)^2 = -8(y+2)$
Domain: $\mathbb{R}$
Range: $y \leq -2$

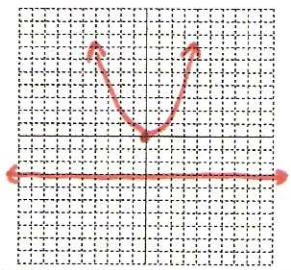
x^2
$(x-h)^2 = 4p(y-k)$



3. parabola with its vertex at $(\overset{h}{0},\overset{k}{0})$ and its directrix at $y=-3$

Direction it opens: up
Value of p: $+3$
Equation in Standard Form: $(x-0)^2 = 12(y-0)$
Domain: $\mathbb{R}$
Range: $y \geq 0$

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

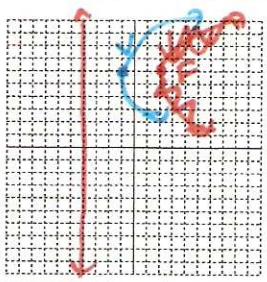


4. parabola with its focus at $(2,6)$ and its directrix at $x=-4$

Direction it opens: right
Value of p: $+3$
Equation in Standard Form: $(y-6)^2 = 12(x+1)$
Domain: $x \geq -1$
Range: $\mathbb{R}$

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

vertex $(-1,6)$

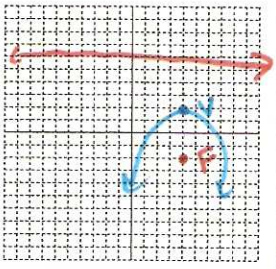


5. parabola with its focus at $(4,-2)$ and its directrix at $y=6$

Direction it opens: down
Value of p: -4
Equation in Standard Form: $(x-4)^2 = -16(y-2)$
Domain: $\mathbb{R}$
Range: $y \leq 2$

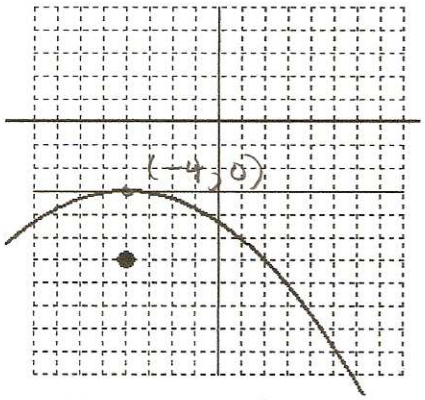
x^2
$(x-h)^2 = 4p(y-k)$

vertex $(4,2)$



II. Write the parabola's equation in standard form.

6.



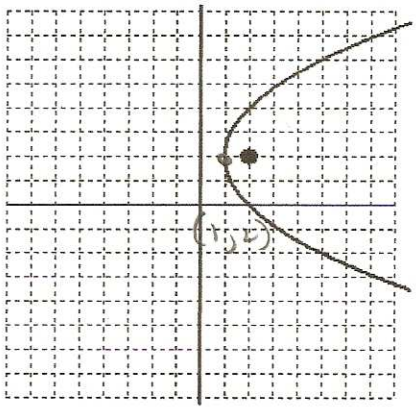
x^2, opens down

$p = -3$

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

Equation in Standard Form: $(x+4)^2 = -12(y-0)$

7.



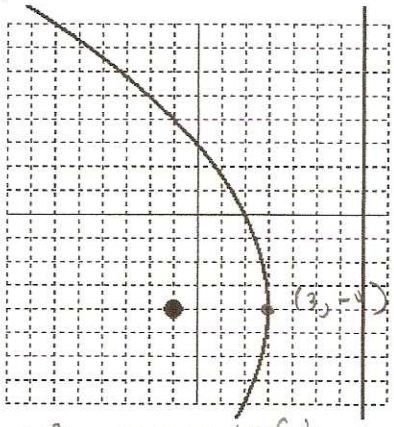
y^2, opens right

$p = +1$

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

Equation in Standard Form: $(y-2)^2 = 4(x-1)$

8.



y^2, opens left

$p = -4$

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

Equation in Standard Form: $(y+4)^2 = -16(x-3)$

III. Find the standard form of each parabola by completing the square. Then graph the parabola.

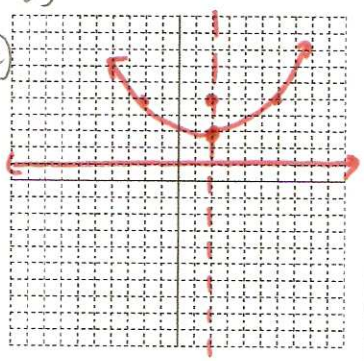
7. $x^2 - 4x - 8y + 28 = 0$

$x^2 - 4x + \underline{4} = 8y - 28 + \underline{4}$

$(x-2)^2 = 8y - 24$

$(x-2)^2 = 8(y-3)$

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



Equation in Standard Form: $(x-2)^2 = 8(y-3)$

Direction it opens: up

Vertex: (2, 3)

Value of p: +2

Axis of Symmetry: $x = 2$

Focus: (2, 5)

Directrix: $y = 1$

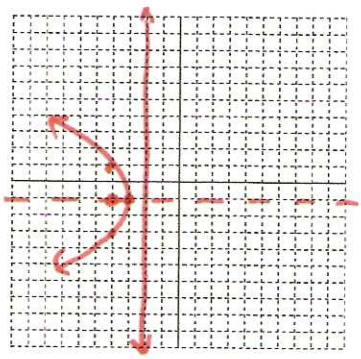
8. $y^2 + 4x + 2y - 11 = 0$

$y^2 + 2y + \underline{1} = -4x + 11 + \underline{1}$

$(y+1)^2 = -4x + 12$

$(y+1)^2 = -4(x+3)$

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



Equation in Standard Form: $(y+1)^2 = -4(x+3)$

Direction it opens: left

Vertex: (−3, −1)

Value of p: −1

Axis of Symmetry: $y = -1$

Focus: (−4, −1)

Directrix: $x = -2$