

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

4

8.02 Parabolas - Day 2

Date: _____

Write the standard form of the equation and graph each parabola. Find the vertex, focus, focal width, axis of symmetry, and directrix.

1. $y^2 + 12x = 2y - 13$

$\checkmark \left(\frac{b}{2}\right)^2 \rightarrow \left(\frac{-2}{2}\right)^2 = (-1)^2 = 1$

$y^2 - 2y + 1 = -12x - 13 + 1$
 $(y-1)(y-1) = -12x - 12$

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

Standard Equation: $(y-1)^2 = -12(x+1)$

$4p = -12$
 $p = -3$

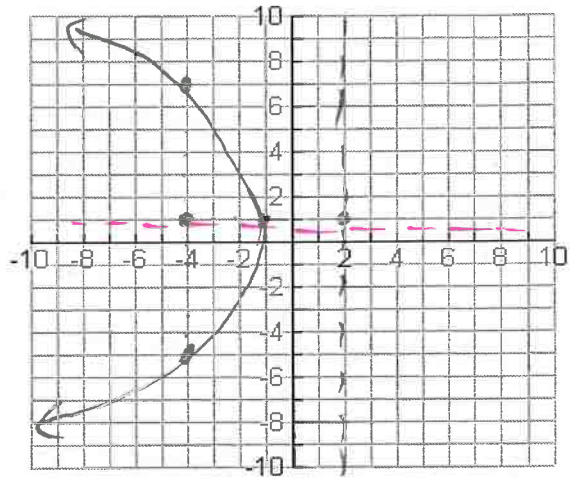
Focus: $(-4, 1)$

Vertex: $(-1, 1)$

Directrix: $x = 2$

AOS: $y = 1$

Focal Width: 12



2. $x^2 + 10x + 25 = -8y + 24$

$(x+5)(x+5) = -8(y-3)$

$(x+5)^2 = -8(y-3)$

Standard Equation: $(x+5)^2 = -8(y-3)$

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

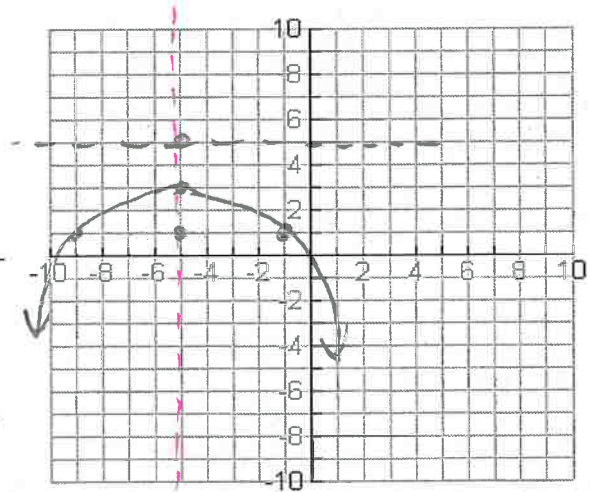
Focus: $(-5, 1)$

Vertex: $(-5, 3)$

Directrix: $y = 5$

AOS: $x = -5$

Focal Width: 8



3. $3x^2 - 30y - 18x + 87 = 0$

$x^2 - 10y - 6x + 29 = 0$

$x^2 - 6x + 9 = 10y - 29 + 9$

$(x-3)(x-3) = 10y - 20$

Standard Equation: $(x-3)^2 = 10(y-2)$

$4p = 10$
 $p = 2.5$

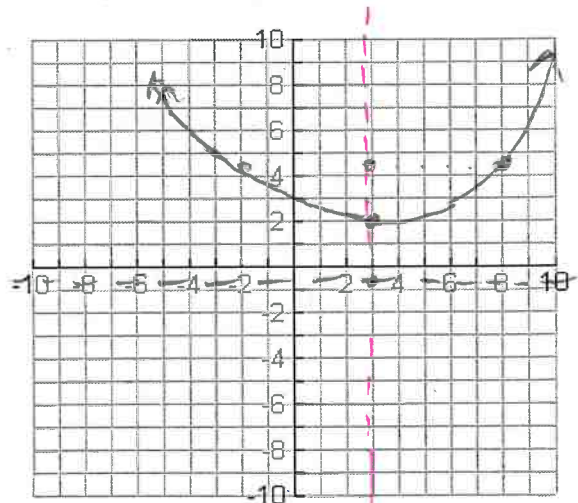
Focus: $(3, 4.5)$

Vertex: $(3, 2)$

Directrix: $y = -0.5$

AOS: $x = 3$

Focal Width: 10



8.02 Practice:

Date: _____

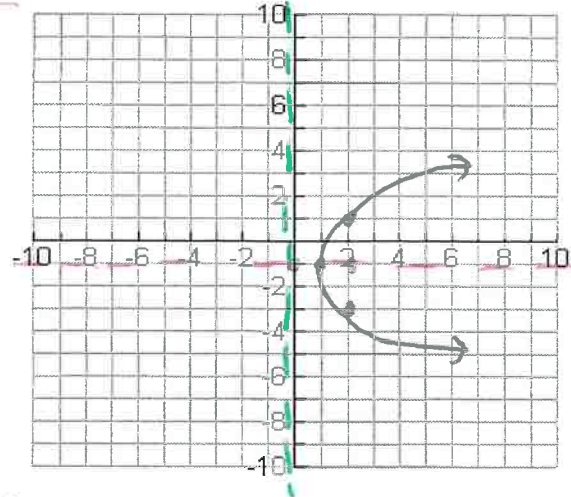
Write the standard form of the equation and graph each parabola. Find the vertex, focus, focal width, axis of symmetry, and directrix.

1. $12x - 15 = 3y^2 + 6y$ $3y^2 + 6y = 12x - 15$

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

$4p=4$
 $p=1$

Standard Equation: $(y+1)^2 = 4(x-1)$
 Focus: $(2, -1)$
 Vertex: $(1, -1)$ Directrix: $x=0$
 AOS: $y=-1$ Focal Width: 4



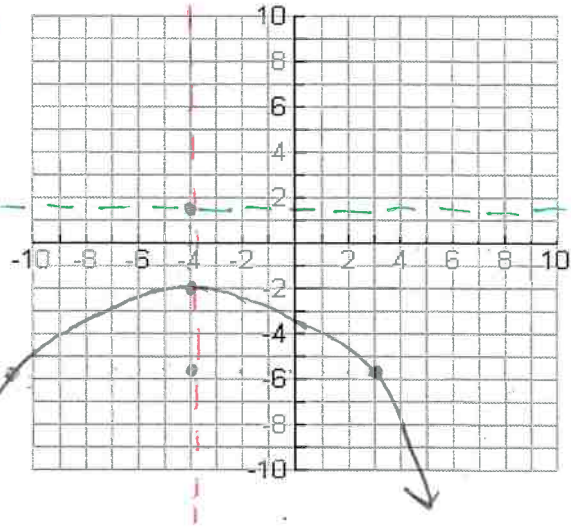
AOS $y=-1$

2. $x^2 + 8x + 14y = -44$ $x^2 + 8x = -14y - 44$

$x^2 + 8x + 16 = -14y - 44 + 16$
 $(x+4)(x+4) = -14y - 28$
 $(x+4)^2 = -14(y+2)$

$4p=-14$
 $p=-14/4$
 $p=-3.5$

Standard Equation: $(x+4)^2 = -14(y+2)$
 Focus: $(-4, -5.5)$
 Vertex: $(-4, -2)$ Directrix: $y=1.5$
 AOS: $x=-4$ Focal Width: 14

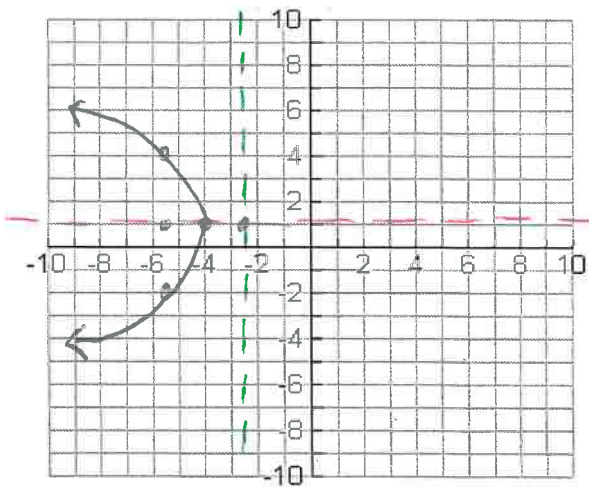


3. $2y^2 - 4y + 12x + 50 = 0$ $y^2 - 2y + 6x + 25 = 0$

$y^2 - 2y + 1 = -6x - 25 + 1$
 $(y-1)(y-1) = -6x - 24$
 $(y-1)^2 = -6(x+4)$

$4p=-6$
 $p=-1.5$

Standard Equation: $(y-1)^2 = -6(x+4)$
 Focus: $(-5.5, 1)$
 Vertex: $(-4, 1)$ Directrix: $x=-2.5$
 AOS: $y=1$ Focal Width: 6



AOS $y=1$