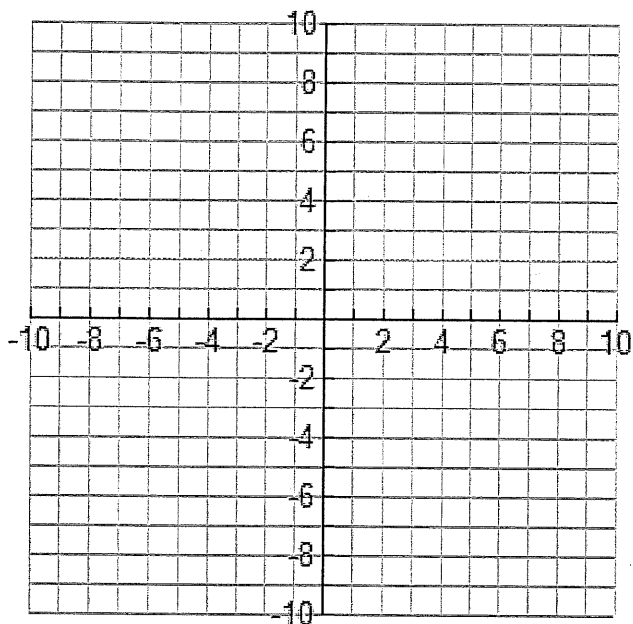


CCGPS Analytic Geometry Day 3: Solving Systems of Equations Practice

Solve the system algebraically, and then prove your solution graphically.

1.

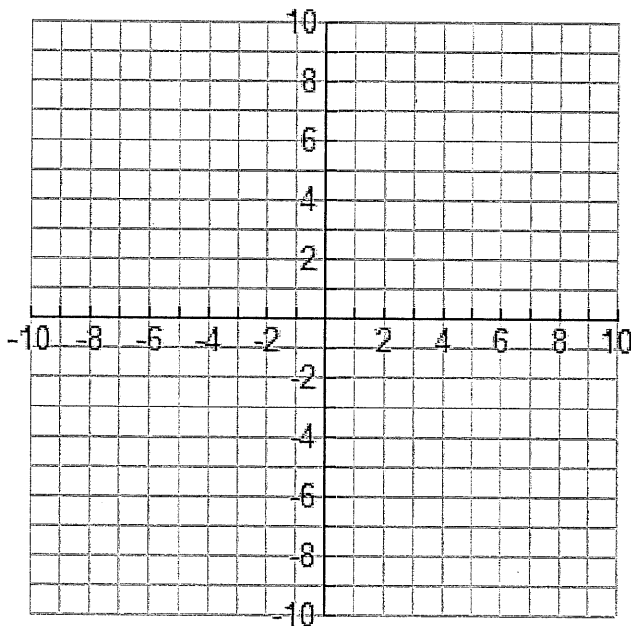
$$4x + y^2 - 8y - 6 = -10$$
$$y - 2x + 2 = 0$$



Parabola Equation: _____ Vertex: _____ Focus: _____ Focal Width: _____

2.

$$4x + y^2 + 6y = -5$$
$$y + 1 = -2x$$



Parabola Equation: _____

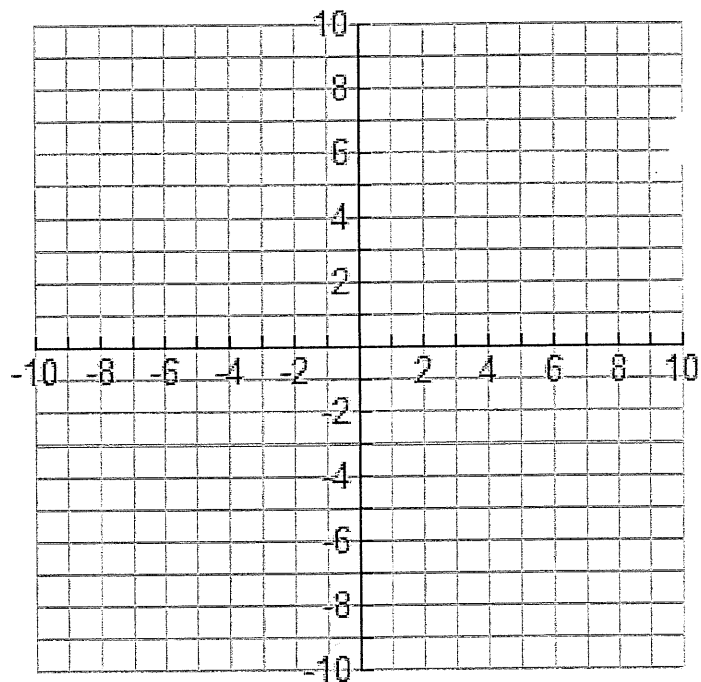
Vertex: _____ Focus: _____

Focal Width: _____

3.

$$x^2 + y^2 - 2x - 2y = 2$$

$$x + y = 4$$

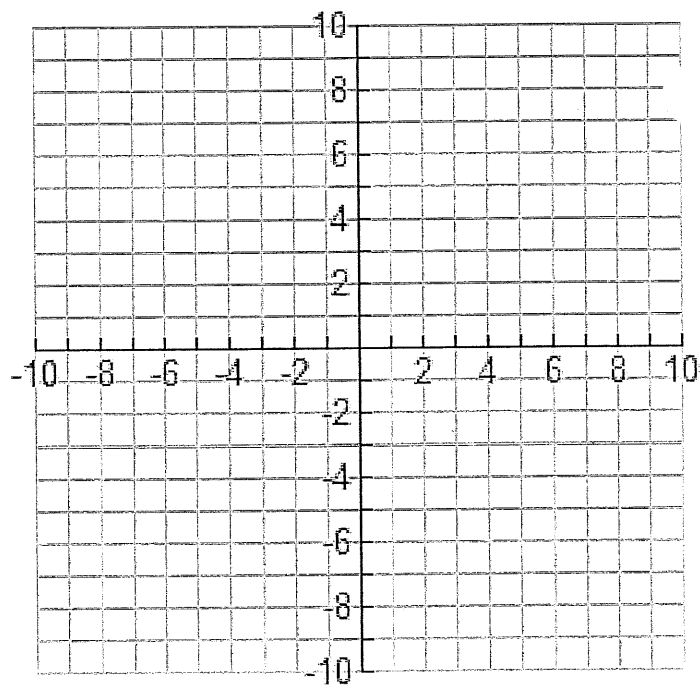


Circle Equation: _____ Center: _____ radius: _____

4:

$$x^2 + y^2 - 2x + 2y - 14 = 0$$

$$x^2 + y^2 - 10x - 6y + 18 = 0$$



Circle Equation: _____ Center: _____ radius: _____

CCGPS Analytic Geometry Day 3: Solving Systems of Equations Practice

KEY

Solve the system algebraically, and then prove your solution graphically.

1.

$$\begin{aligned} 4x + y^2 - 8y - 6 &= -10 \\ y - 2x + 2 &= 0 \end{aligned}$$

$$y = 2x - 2$$

$$4x + (2x - 2)^2 - 8(2x - 2) + 4 = 0$$

$$4x + 4x^2 - 8x + 4 - 16x + 16 + 4 = 0$$

$$4x^2 - 20x + 24 = 0$$

$$4(x^2 - 5x + 6) = 0$$

$$\begin{array}{r} -2 \quad 6 \quad -3 \\ \times \\ \hline 1 \quad -5 \end{array}$$

$$4(x - 2)(x - 3) = 0$$

$$x = 2, x = 3$$

$$y - 2x + 2 = 0$$

plug $x = 2$

$$y - 4 + 2 = 0$$

$$y = 2$$

$$(2, 2)$$

$$y - 2x + 2 = 0$$

plug $x = 3$

$$y - 6 + 2 = 0$$

$$y = 4$$

$$(3, 4)$$

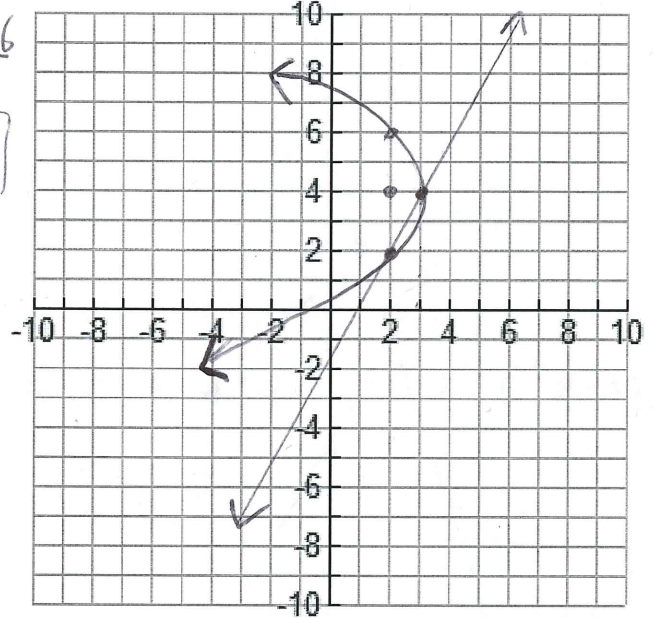
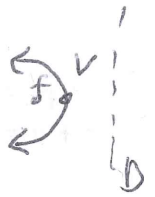
$$y^2 - 8y = -4x - 4$$

$$y^2 - 8y + 16 = -4x - 4 + 16$$

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

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

$$\left(\frac{b}{2}\right)^2 = \left(\frac{-8}{2}\right)^2 = (-4)^2 = 16$$



Parabola Equation: $(y - 4)^2 = -4(x - 3)$ Vertex: $(3, 4)$ Focus: $(2, 4)$ Focal Width: 4

2.

$$\begin{aligned} 4x + y^2 + 6y &= -5 \\ y + 1 &= -2x \end{aligned}$$

$$y = -1 - 2x$$

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

$$4x + 1 + 4x + 4x^2 - 6 - 12x + 5 = 0$$

$$4x^2 - 4x = 0$$

$$4x(x - 1) = 0$$

$$4x = 0 \quad | \quad x - 1 = 0$$

$$x = 0 \quad | \quad x = 1$$

$$y + 1 = -2x$$

$$\text{plug } x = 0$$

$$y + 1 = 0$$

$$y = -1$$

$$y + 1 = -2x$$

$$\text{plug } x = 1$$

$$y + 1 = -2$$

$$y = -3$$

$$(0, -1)$$

$$(1, -3)$$

$$y^2 + 6y + 9 = -4x - 5 + 9$$

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

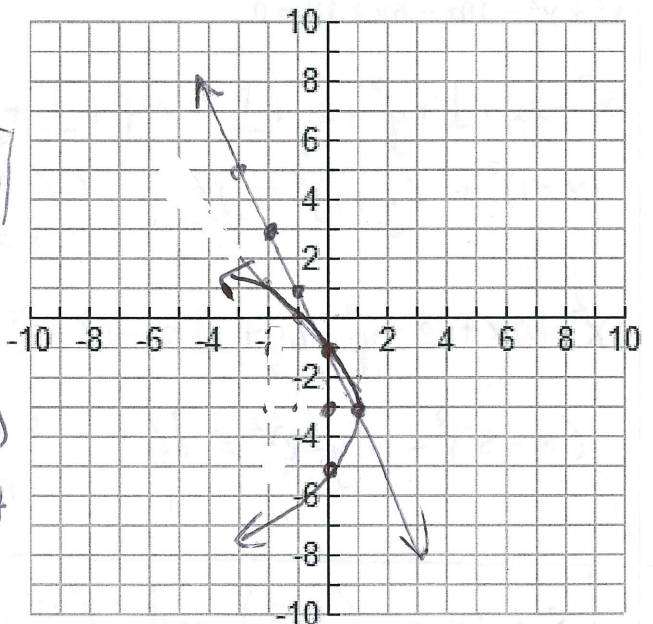
$$(y + 3)^2 = -4(x - 1)$$

$$\text{vertex: } (1, -3)$$

$$p = -1$$

$$\text{focus: } (0, -3)$$

$$\text{focal width} = 4$$



3.

$$x^2 + y^2 - 2x - 2y = 2$$

$$x + y = 4$$

$$x = 4 - y$$

$$(4 - y)^2 + y^2 - 2(4 - y) - 2y - 2 = 0$$

$$16 - 8y + y^2 + y^2 - 8 + 2y - 2y - 2 = 0$$

$$2y^2 - 8y + 6 = 0$$

$$2(y^2 - 4y + 3) = 0$$

3	-1
-3	1
1	-4
-4	1

$x + y = 4$	$x + y = 4$
$x + 1 = 4$	$x + 3 = 4$
$x = 3$	$x = 1$

$(3, 1)$	$(1, 3)$
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$$2(y - 1)(y - 3)$$

$$y = 1, y = 3$$

$$x^2 - 2x + 1 + y^2 - 2y + 1 = 2 + 1 + 1$$

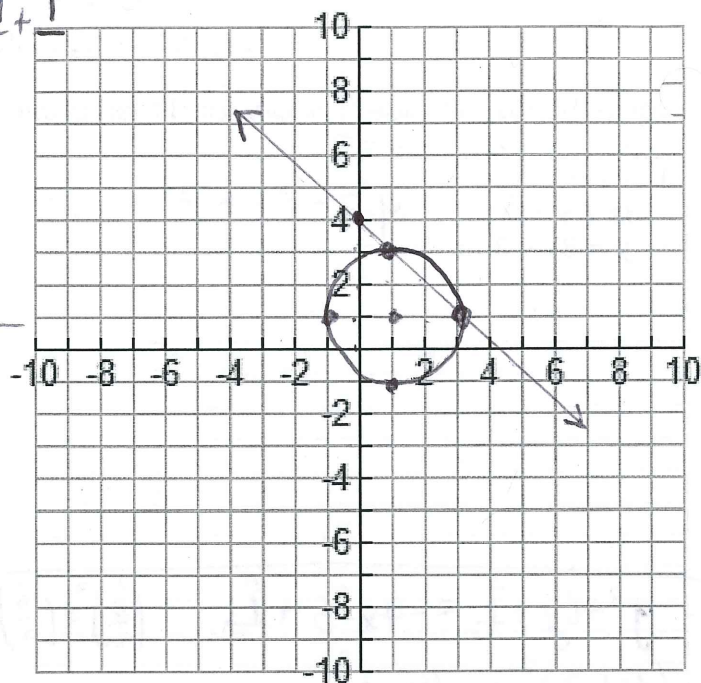
$$(x - 1)^2 + (y - 1)^2 = 4$$

Center: $(1, 1)$

radius: 2

$$x + y = 4$$

$$y = -x + 4$$



4.

$$x^2 + y^2 - 2x + 2y - 14 = 0$$

$$x^2 + y^2 - 10x - 6y + 18 = 0$$

$$x^2 - 2x + 1 + y^2 + 2y + 1 = 14 + 1 + 1$$

$$(x - 1)^2 + (y + 1)^2 = 16 \quad C(1, -1)$$

$$r = 4$$

$$x^2 - 10x + 25 + y^2 - 6y + 9 = -18 + 25 + 9$$

$$(x - 5)^2 + (y - 3)^2 = 16 \quad C(5, 3)$$

$$r = 4$$

Solutions: $(1, 3)$ and $(5, -1)$

