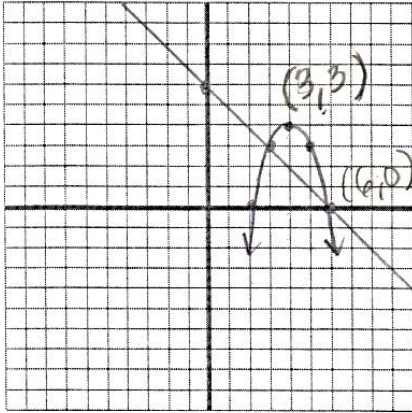


Solving Non-Linear Systems HW

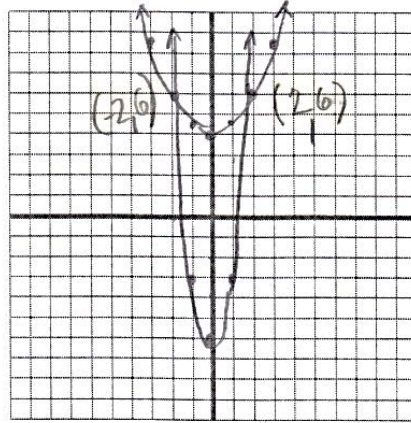
Name Master E
Date _____ Block _____

SOLVE GRAPHICALLY: Graph each system & state the points of intersection.
You may need to use your graphing calculator to find an approximate solution!

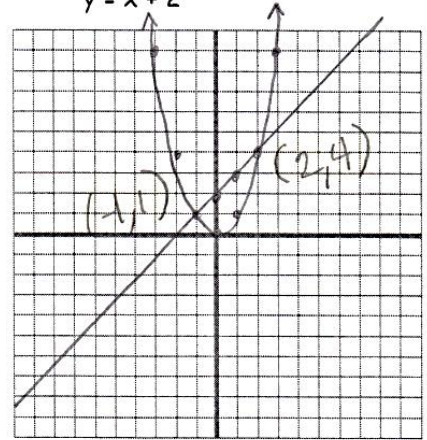
1. $x + y = 6$
 $y = -(x - 4)^2 + 4$



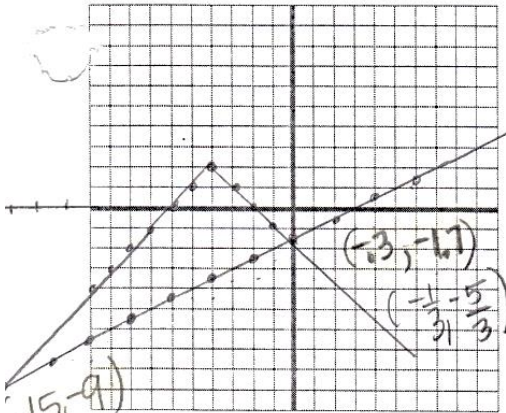
2. $2y = x^2 + 8$ $y = \frac{1}{2}x^2 + 4$
 $y = 3x^2 - 6$



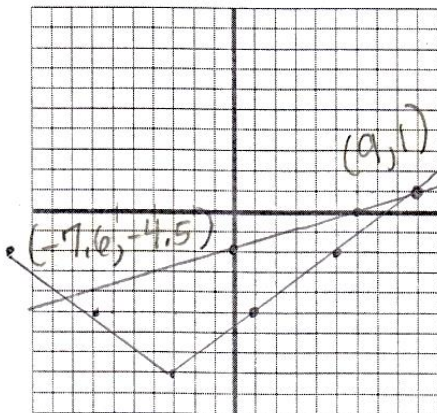
3. $y = x^2$
 $y = x + 2$



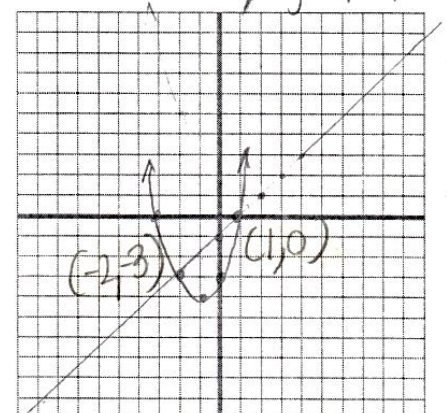
4. $2y = x - 3$ $y = \frac{1}{2}x - \frac{3}{2}$
 $y = -|x + 4| + 2$



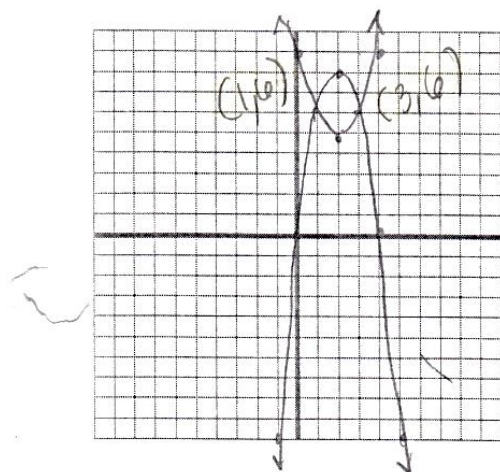
5. $-x + 3y = -6$ $3y = x - 6$ $y = \frac{1}{3}x - 2$
 $y = \frac{3}{4}|x + 3| - 8$



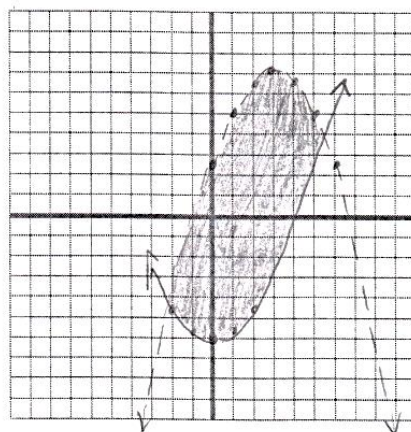
6. $y + 4 = (x + 1)^2$ $y = (x + 1)^2 - 4$
 $x - y = 1$ $y = x - 1$



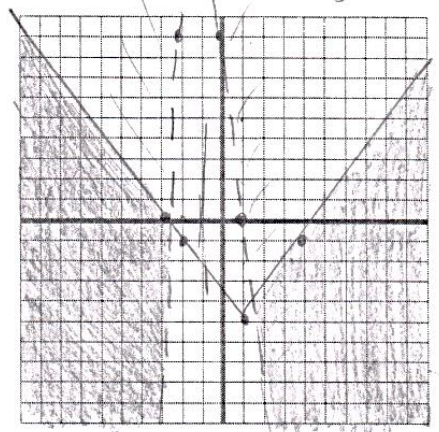
7. $y = -2(x - 2)^2 + 8$
 $y = (x - 2)^2 + 5$



8. $y < \frac{-1}{2}(x - 3)^2 + 7$
 $y \geq \frac{1}{3}x^2 - 6$



9. $y \leq \frac{4}{3}|x - 1| - 5$
 $y > -3(x - 1)(x + 3)$ $10, 30$
 $3, 9$



SOLVE ALGEBRAICALLY: Use substitution or elimination to solve.
 Verify your solutions using the graphing calculator!

1. $y = x^2 - 4$
 $y = 3x$

$$x^2 - 4 = 3x$$

$$x^2 - 3x - 4 = 0$$

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

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

$$y = 3(4) \quad y = 3(-1)$$

$$y = 12 \quad y = -3$$

$(4, 12) \quad (-1, -3)$

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

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

$$x + -(x^2 - 8x + 16) - 2 = 0$$

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

$$-x^2 + 9x - 18 = 0$$

$$-(x^2 - 9x + 18) = 0$$

$$-(x-6)(x-3) = 0$$

$$x = 6 \quad x = 3$$

$$6 + y = 6 \quad 3 + y = 6$$

$$y = 0 \quad y = 3$$

$(6, 0) \quad (3, 3)$

3. $y = (x-1)^2 + 3$
 $2x + y = 5$

$$2x + (x-1)^2 + 3 = 5$$

$$2x + x^2 - 2x + 1 + 3 = 5$$

$$x^2 + 4 = 5$$

$$x^2 = 1$$

$$x = 1 \quad x = -1$$

$$2 + y = 5 \quad -2 + y = 5$$

$$y = 3 \quad y = 7$$

$(1, 3) \quad (-1, 7)$

4. $x = 2(y+1)^2 - 6$
 $x + 3y = 5$

$$2(y+1)^2 - 6 + 3y = 5$$

$$2(y^2 + 2y + 1) - 6 + 3y = 5$$

$$2y^2 + 4y + 2 - 6 + 3y = 5$$

$$2y^2 + 7y - 9 = 0$$

$$(2y+9)(y-1) = 0$$

$$y = -\frac{9}{2} \quad y = 1$$

$$x + 3(-\frac{9}{2}) = 5 \quad x + 3 = 5$$

$$x + \frac{-27}{2} = 5 \quad x = 2$$

$$x = 18.5$$

$(2, 1)$
 $(18.5, 4.5)$

5. $3y = (x+3)^2 - 12$
 $x - y = -5 \quad y = x + 5$

$$3(x+5) = (x+3)^2 - 12$$

$$3x + 15 = x^2 + 6x + 9 - 12$$

$$x^2 + 3x - 18 = 0$$

$$(x+6)(x-3) = 0$$

$$x = -6 \quad x = 3$$

$$-6 - y = -5 \quad 3 - y = -5$$

$$-y = 1 \quad -y = -8$$

$$y = -1 \quad y = 8$$

$(-6, -1) \quad (3, 8)$

6. $x + 2y^2 = 4$
 $y = -x + 1 \quad x = -y + 1$

$$-y + 1 + 2y^2 = 4$$

$$2y^2 - y - 3 = 0$$

$$(2y-3)(y+1) = 0$$

$$y = \frac{3}{2} \quad y = -1$$

$$\frac{3}{2} = -x + 1 \quad -1 = -x + 1$$

$$.5 = -x \quad -2 = -x$$

$$2 = x$$

$x = -.5 \quad x = 2$
 $(-.5, 1.5) \quad (2, -1)$

7. $x^2 = 8y$
 $(x-2)^2 = 8y$

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

$$x^2 = x^2 - 4x + 4$$

$$-4 = -4x$$

$$1 = x$$

$$1^2 = 8y$$

$$\frac{1}{8} = y$$

$(1, \frac{1}{8})$

8. $2y = (x+5)^2 + 4$
 $y = x^2 + 10x + 25$

$$2(x^2 + 10x + 25) = (x+5)^2 + 4$$

$$2x^2 + 20x + 50 = x^2 + 10x + 25 + 4$$

$$x^2 + 10x + 21 = 0$$

$$(x+7)(x+3) = 0$$

$$x = -7 \quad x = -3$$

$$y = (-7)^2 + 10(-7) + 25$$

$$y = 49 - 70 + 25$$

$$y = 4$$

$$y = (-3)^2 + 10(-3) + 25$$

$$y = 9 - 30 + 25$$

$$y = 4$$

$(-7, 4) \quad (-3, 4)$

9. $6 - y = x^2 - 4x + 4$
 $y = \frac{-1}{2}(x-2)^2 + 4$
 $y = -x^2 + 4x + 2$

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

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

$$-\frac{1}{2}x^2 + 2x - 2 + 4 = -x^2 + 4x + 2$$

$$\frac{1}{2}x^2 - 2x = 0$$

$$\frac{1}{2}x(x-4) = 0$$

$$x = 0 \quad x = 4$$

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

$$= -\frac{1}{2}(4) + 4$$

$$= -2 + 4$$

$$= 2$$

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

$$= 2$$

$(4, 2)$
 $(0, 2)$