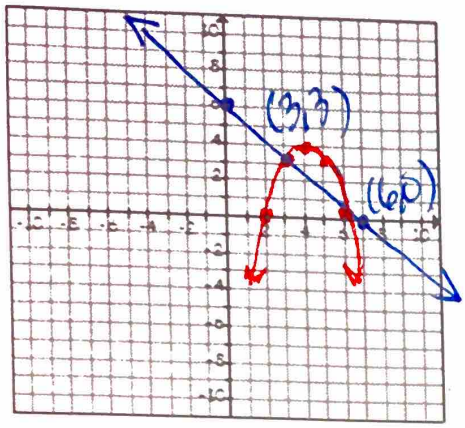
Day 05 Solving Non-Linear Systems CW/HW

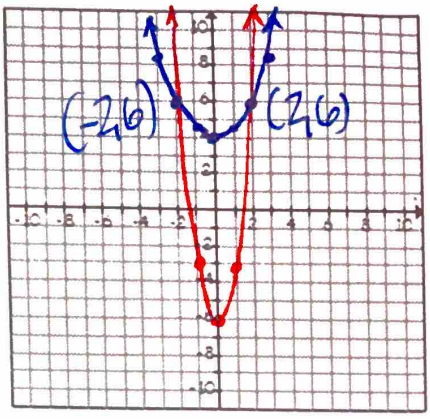
Name Master 6
Date _____ Block 6

Part A: Solve the system GRAPHICALLY: *Graph each system & state the points of intersection.*
Part B: Solve the same system ALGEBRAICALLY: *Use SUBSTITUTION/ELIMINATION to confirm your solutions in Part I.*

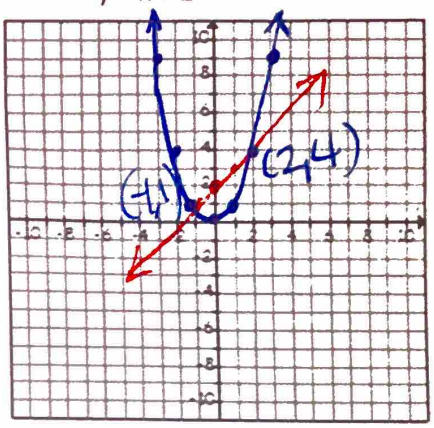
1A. • $x + y = 6$
• $Y = -(x-4)^2 + 4$



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



3A. • $y = x^2$
• $y = x + 2$



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

$-x+6 = -(x-4)^2+4$
$-x+6 = -(x^2-8x+16)+4$
$-x+6 = -x^2+8x-16+4$
$x^2-9x+6 = -12$
$x^2-9x+18 = 0$
$(x-6)(x-3) = 0$
$6 \quad 3$
$x=6 \quad 6+y=6 \quad y=0$
$x=3 \quad 3+y=6 \quad y=+3$
$(6,0) \ (3,+3)$

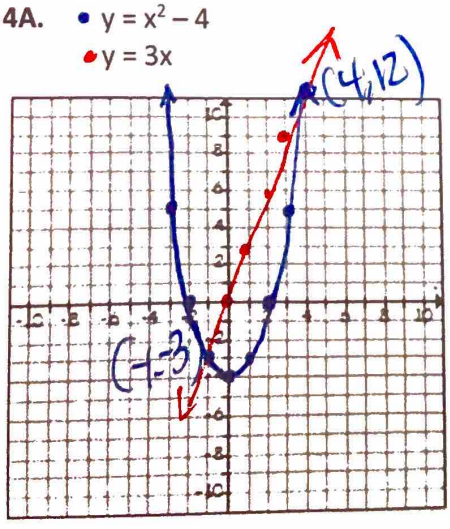
2B. $2y = x^2 + 8$
$y = 3x^2 - 6$

$2(3x^2-6) = x^2+8$
$6x^2-12 = x^2+8$
$5x^2 = 20$
$x^2 = 4$
$x = \pm 2$
$x=2 \quad y = 3(2)^2-6 =$
$= 3(4)-6 = 6$
$x=-2 \quad y = 3(-2)^2-6$
$3(4)-6=6$
$(2,6), (-2,6)$

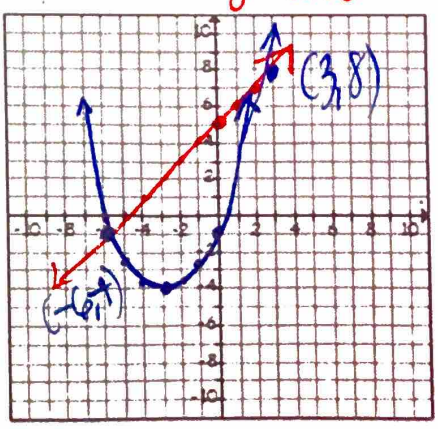
3B. $y = x^2$
$y = x + 2$

$x^2 = x+2$
$x^2-x-2=0$
$(x-2)(x+1)=0$
$x = 2, -1$
$x=2 \quad y=(2)^2=4$
$x=-1 \quad y=(-1)^2=1$
$(2,4) \ (-1,1)$

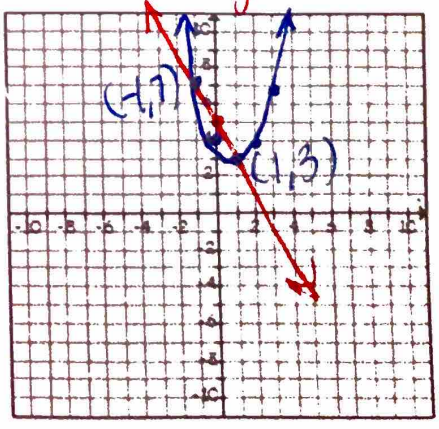
4A. • $y = x^2 - 4$
• $y = 3x$



5A. • $3y = (x+3)^2 - 12$ $y = \frac{1}{3}(x+3)^2 - 4$
• $x - y = -5$ $y = x + 5$



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



4B. $y = x^2 - 4$, $y = 3x$

$x^2 - 4 = 3x$

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

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

$x = 4, -1$

$x = 4 \quad y = 3(4) = 12$

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

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

5B. $3y = (x+3)^2 - 12$, $x - y = -5$

$y = x + 5$

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

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

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

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

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

$x = -6, 3$

$x = -6 \quad y = -6 + 5 = -1$

$x = 3 \quad y = 3 + 5 = 8$

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

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

$y = -2x + 5$

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

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

$x^2 + 4 = 5$

$x^2 = 1$

$x = \pm 1$

$x = 1 \quad 2(1) + y = 5$

$y = 3$

$x = -1 \quad 2(-1) + y = 5$

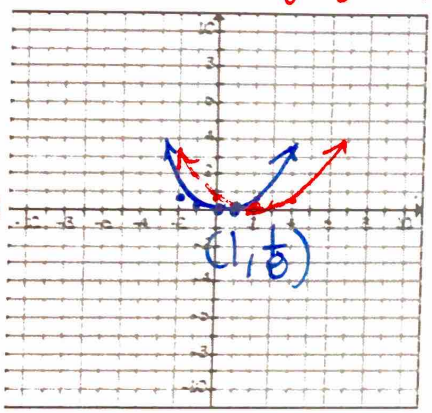
$-2 + y = 5$

$y = 7$

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

7A. • $x^2 = 8y$ $y = \frac{1}{8}x^2$

• $(x-2)^2 = 8y$ $y = \frac{1}{8}(x-2)^2$



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

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

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

$0 = -4x + 4$

$-4 = -4x$

$1 = x$

$(1)^2 = 8y$

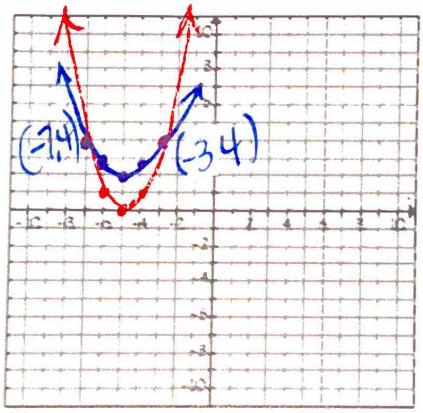
$1 = 8y$

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

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

8A. • $2y = (x+5)^2 + 4$ $y = \frac{1}{2}(x+5)^2 + 2$

• $y = x^2 + 10x + 25$ $= (x+5)^2$



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

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

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

$x^2 + 10x + 50 = 29$

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

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

$x = -7, -3$

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

$= 49 - 70 + 25$

$= 4$

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

$9 - 30 + 25 = 4$

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

9A. • $6 - y = x^2 - 4x + 4$ $y = -x^2 + 4x + 2$

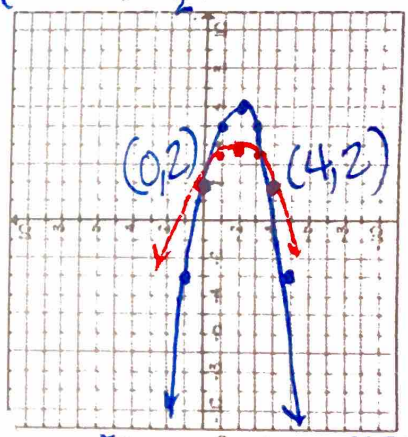
• $y = \frac{-1}{2}(x-2)^2 + 4$.

$x = \frac{-4}{-2} = 2$

$y = -4 + 8 + 2$

$y = 6$

$V(2, 6)$



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

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

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

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

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

$+x^2 \qquad\qquad\qquad +x^2$

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

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

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

$\frac{1}{2}x = 2$

$x = 4$

$x = 0 \quad y = -(0)^2 + 4(0) + 2$

$= 2$

$x = 4 \quad y = -(4)^2 + 4(4) + 2$

$-16 + 16 + 2 = 2$

$(0, 2) \quad (4, 2)$