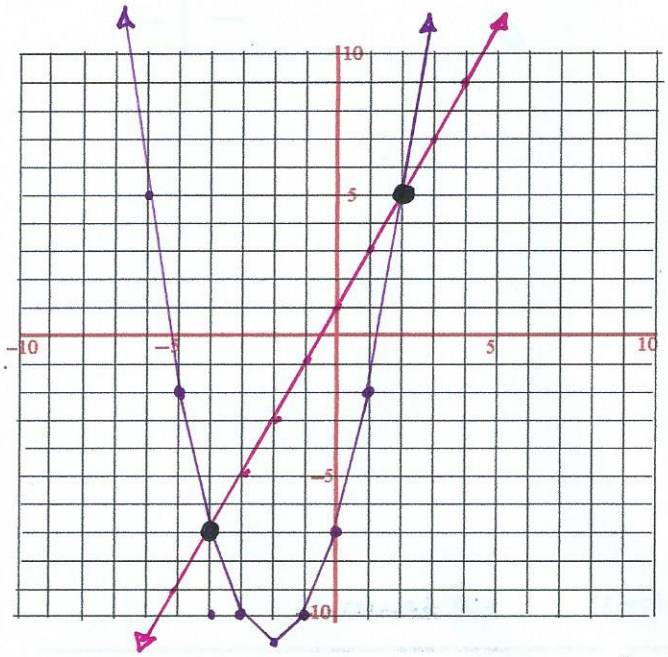
Honors Algebra 2
Solving Non-Linear Systems

Name: Key
Date: _____ **Period:** ____

Solve each system of non-linear equations graphically and algebraically.

Graphically.

1A.) $y = x^2 + 4x - 7$
$2x - y = -1$ → $y = 2x + 1$



Solution(s): (−4, −7) AND (2, 5)

Algebraically.

1B.) $y = x^2 + 4x - 7$
$2x - y = -1$ → $y = 2x + 1$

$x^2 + 4x - 7 = 2x + 1$

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

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

oC	+b
−8	2
4	−2

$x + 4 = 0$ → $x = -4$

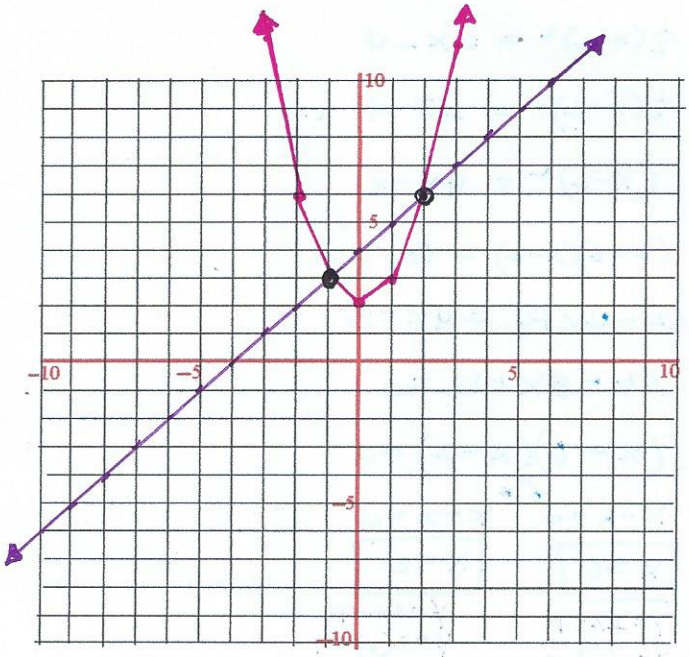
$x - 2 = 0$ → $x = 2$

$y = 2x + 1$
$y = 2(-4) + 1$
$y = -8 + 1$
$y = -7$

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

Solution(s): (−4, −7) AND (2, 5)

2A.) $x - y = -4$ → $y = x + 4$
$x^2 - y = -2$ → $y = x^2 + 2$



Solution(s): (−1, 3) AND (2, 6)

2B.) $x - y = -4$ → $y = x + 4$
$x^2 - y = -2$ → $y = x^2 + 2$

$x^2 + 2 = x + 4$

$x^2 - x - 2 = 0$

$(x-2)(x+1) = 0$

oC	+b
−2	−1
−2	1

$x - 2 = 0$ → $x = 2$

$x + 1 = 0$ → $x = -1$

$y = x + 4$
$y = 2 + 4$
$y = 6$

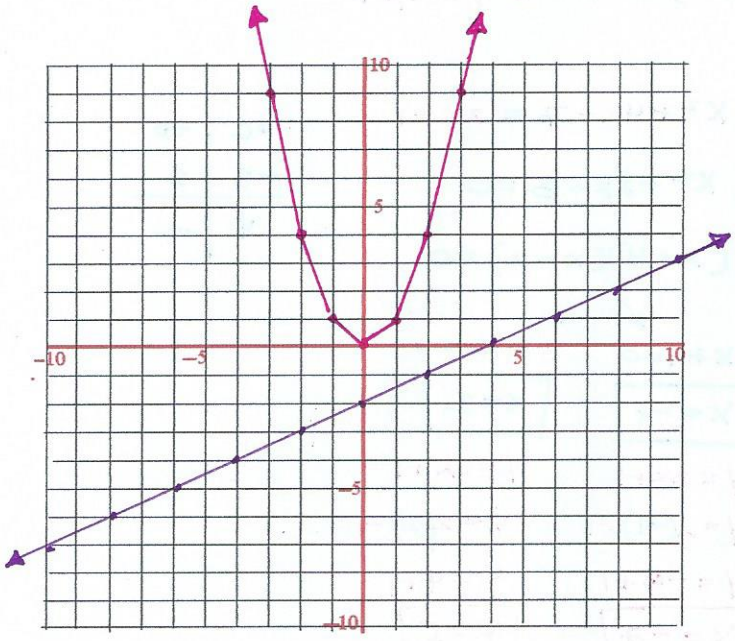
$y = x + 4$
$y = -1 + 4$
$y = 3$

Solution(s): (2, 6) AND (−1, 3)

Graphically.

3A.) $x - 2y = 4$ → $y = \frac{1}{2}x - 2$

$x^2 - y = 0$ → $y = x^2$



Solution(s): NO SOLUTION

Algebraically.

3B.) $x - 2y = 4$ → $y = \frac{1}{2}x - 2$

$x^2 - y = 0$ → $y = x^2$

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

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

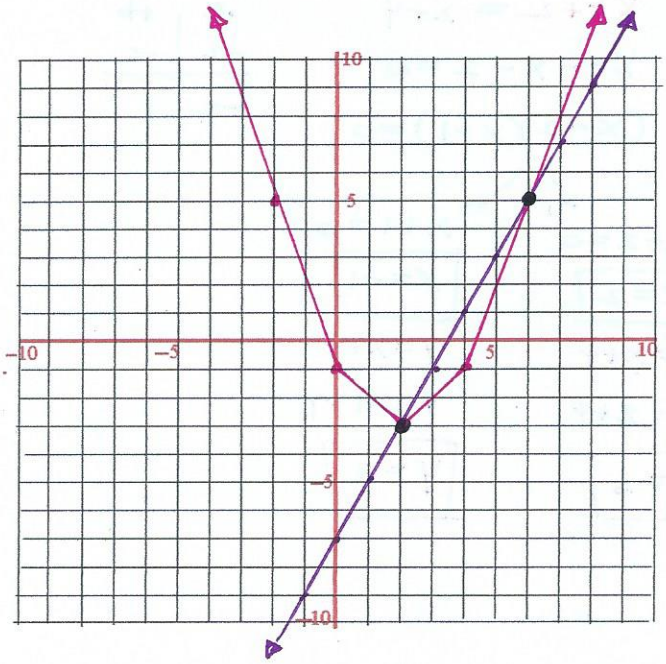
oC	+b
−2	$-\frac{1}{2}$
−	−

$\emptyset$

Solution(s): NO SOLUTION

4A.) $-4x + 2y + 14 = 0$ → $y = 2x - 7$

$y = \frac{1}{2}(x-2)^2 - 3$



Solution(s): (2, −3) AND (6, 5)

4B.) $-4x + 2y + 14 = 0$ → $y = 2x - 7$

$y = \frac{1}{2}(x-2)^2 - 3$

$\frac{1}{2}(x-2)^2 - 3 = 2x - 7$

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

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

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

$(x-2)(x-2) = 4x - 8$

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

$x^2 - 8x + 12 = 0$

$(x-6)(x-2) = 0$

$x - 6 = 0$ $\quad$ $x - 2 = 0$

$x = 6$ $\quad$ $x = 2$

$y = 2x - 7$ $\quad$ $y = 2x - 7$

$y = 2(6) - 7$ $\quad$ $y = 2(2) - 7$

$y = 12 - 7$ $\quad$ $y = 4 - 7$

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

Solution(s): (6, 5) AND (2, −3)