Name Key
8A; Algebra 1

Date _____
Period _____

How Do We Solve A Linear-Quadratic System By Graphing?

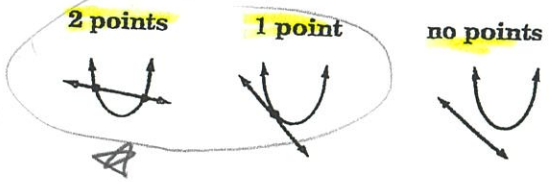
When a parabola and a line are drawn on the same set of axes, the points of intersection, if any, represent the solution set to the system of equations used to graph the parabola and the line.

Graphic Solution steps

To obtain a graphic solution of a linear-quadratic system:

1. **On the same set of axes, graph the linear equation and the quadratic equation.**
2. **From the graph, read the coordinates of the points of intersection.**
3. **Check the solution set in each of the two original equations.**

For a linear-quadratic system, it is possible that the graphs intersect in:



Examples:

1) (a) Solve the following systems of equations graphically.

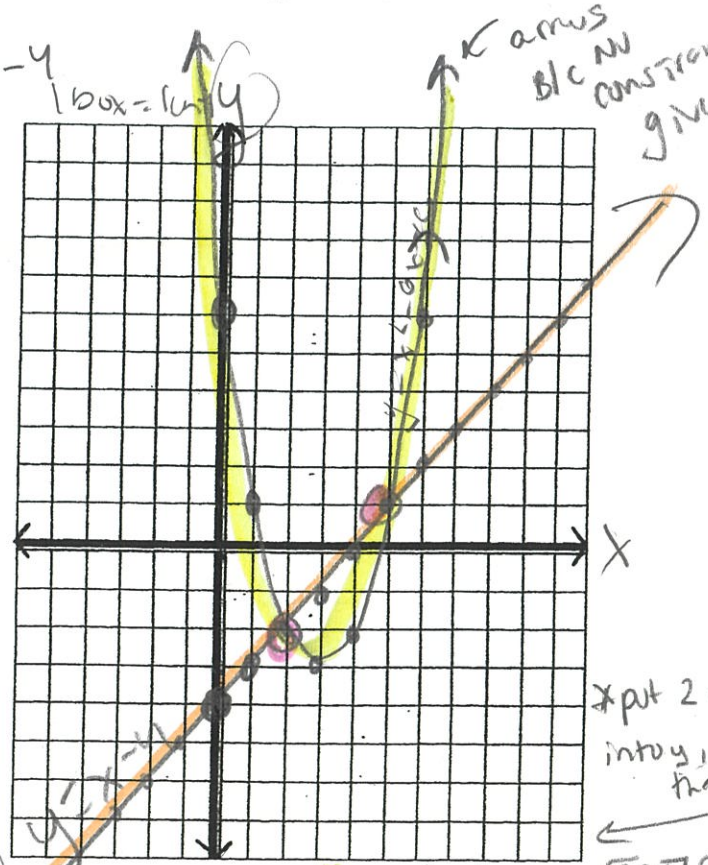
for the solution points

Q $y = x^2 - 6x + 6$

L $y = x - 4$ $m = \frac{1}{1}$ $B = -4$

* Copy all the coordinates you can plot when there are no restrictions

X	$y = x^2 - 6x + 6$	y	(x, y)
0	$y = (0)^2 - 6(0) + 6$	6	(0, 6)
1		1	(1, 1)
2		-2	(2, -2)
3	vertex	-3	(3, -3)
4		-2	(4, -2)
5		1	(5, 1)
6		6	(6, 6)



* put 2 equations into y_1 + y_2 1st = then

check on calc: ① use the table: 2nd Graph and look for y_1 + y_2 to be the same #

② intersect: 2nd Trace 5: intersect Enter x3 and then repeat to find the 2nd point

Solution Points: (2, -2) & (5, 1)

↳ solution points will ALWAYS be in your table. This is where the 2 functions intersect.

x-values of solutions: x = 2 & x = 5

2) (a) Draw the graph of $y = -x^2 + 4x - 3$ for all values of x such that $-1 \le x \le 5$.

(b) On the same set of axes, draw the graph of $x + y = 1$.

(c) Determine the solution set of the system

Constraints form an Interval

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

$x + y = 1$

$x + y = 1$

$y = -x + 1$

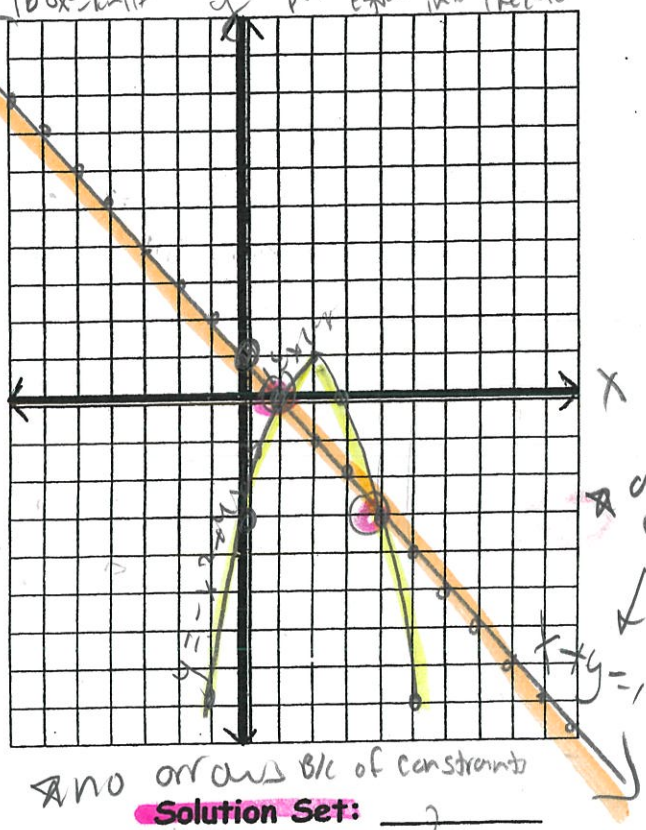
$m = -\frac{1}{1}$

$B = 1$

X	$y = -x^2 + 4x + 3$	y	(x, y)
-1	$y = -(-1)^2 + 4(-1) + 3$	-8	(-1, 8)
0		-3	(0, -3)
1		0	(1, 0)
2	vertex	1	(2, 1)
3		0	(3, 0)
4		-3	(4, -3)
5		-8	(5, -8)

box = limit

put this equation into the calc



original equation

no arrows b/c of constraints

Solution Set: $(1, 0) \cup (4, -3)$

points should be in table

X-values of solutions: $x = 1$ and $x = 4$

Check

3) On the set of axes below, solve the following system of equations graphically for all values of x and y.

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

$y + 2x = 6$
$-2x \quad -2x$
$y = -2x + 6$ put this into calc

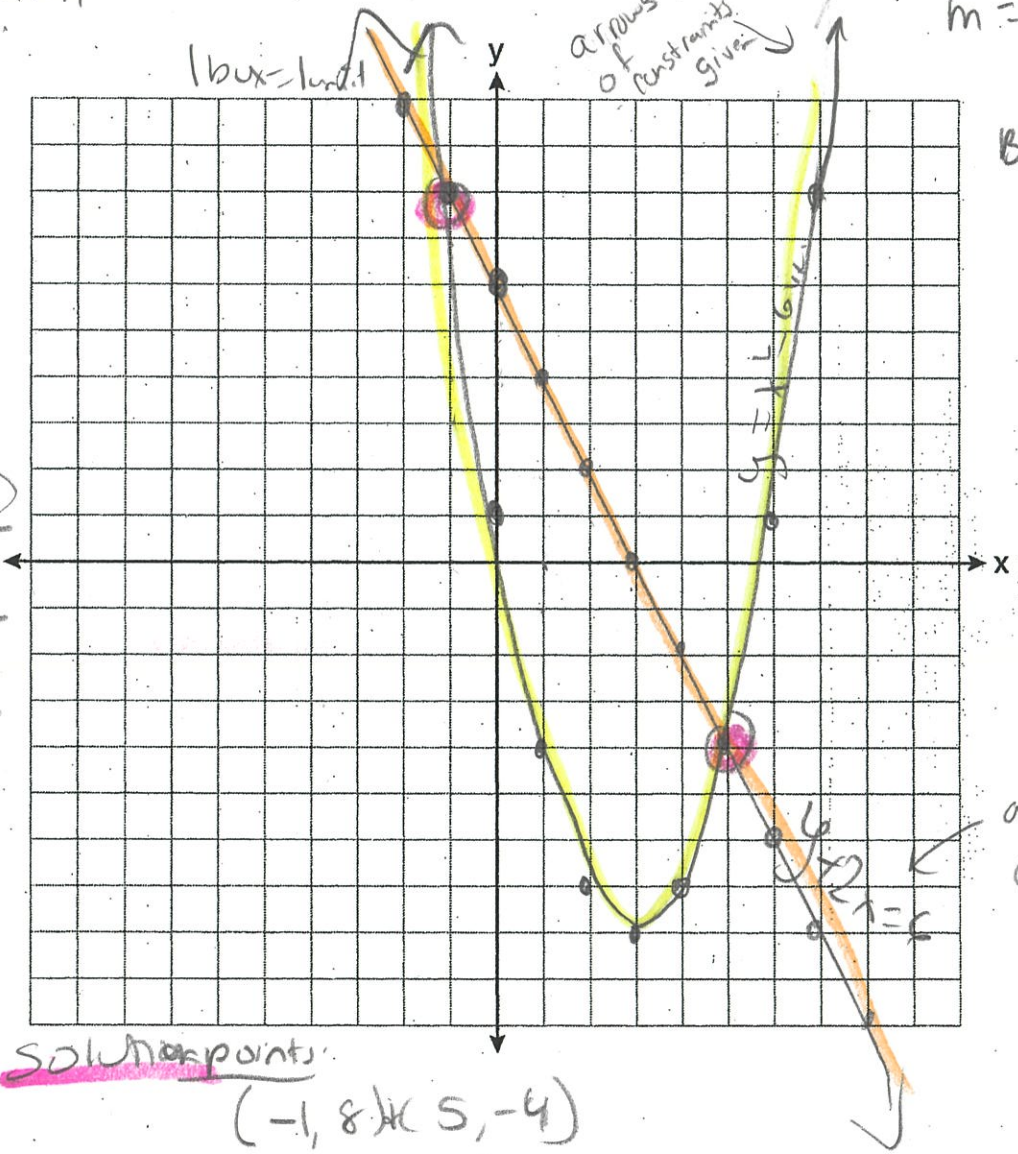
$m = -\frac{2}{1}$ $b = 6$

*copy all the coordinates you can plot!!

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

x	y
-1	8
0	1
1	-4
2	-7
3	-8
4	-7
5	-4
6	1

7/8



solution points:

(-1, 8) & (5, -4)

points should be in table

x-values of solutions $x = -1$ & $x = 5$

41) On the set of axes below, graph the following system of equations.

$y + 2x = x^2 + 4$

$y - x = 4$

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

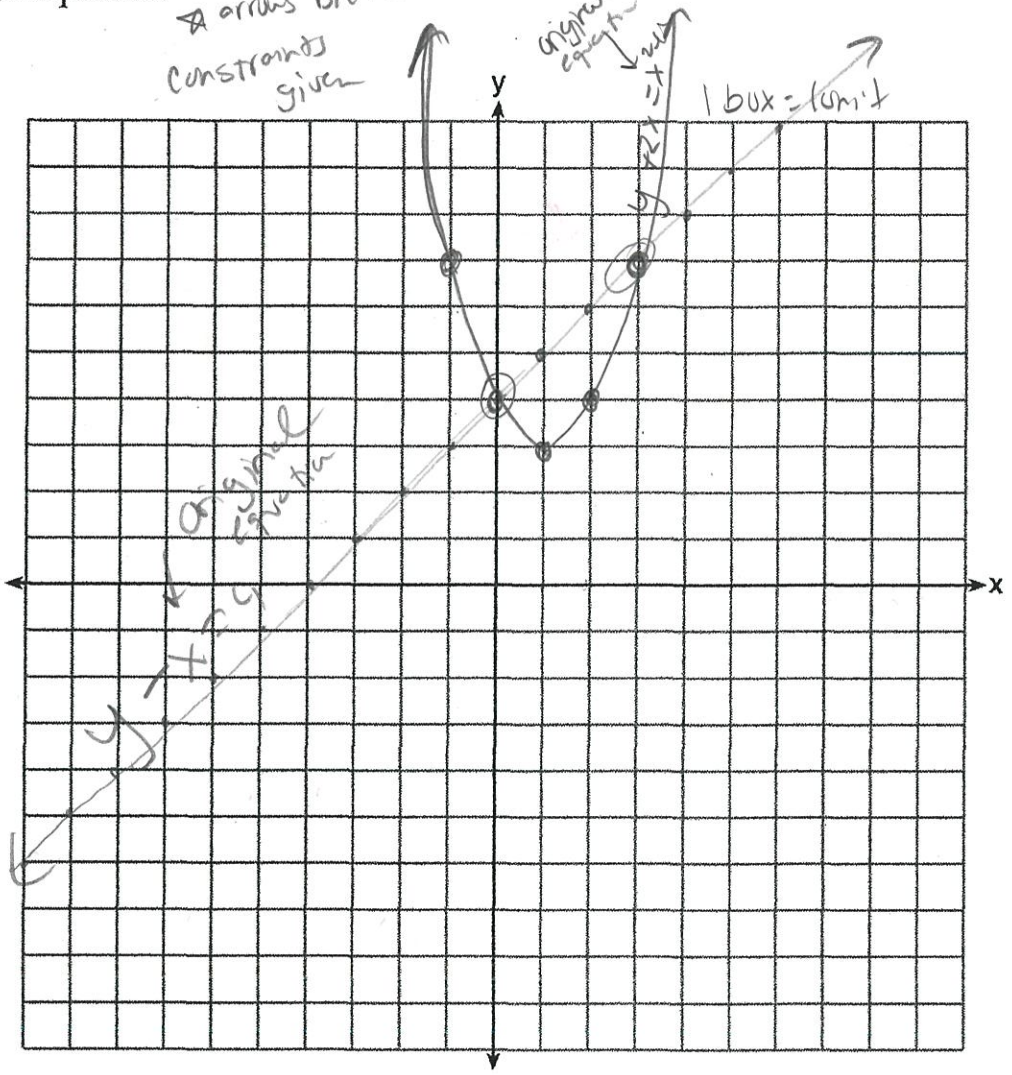
$y = x^2 - 2x + 4$ → put into calc

$y - x = 4$
$+x \quad +x$

$y = x + 4$

$m = 1, \quad B = 4$

Using the graph, determine and state the coordinates of *all* points in the solution set for the system of equations.



x	y
-1	7
0	4
1	3
2	4
3	7

Solution set: (0,4) & (3,7)

points should be in table

x - values of solutions

x = 0 & x = 3

Solve the following system of equations **graphically:**

1) $y = |x-5|$
$y = 3$

* use arrows b/c NO constraints given *

absolute value → right 5

$y = |x-5|$

x	y
-5	10
-4	9
-3	8
-2	7
-1	6
0	5
1	4
2	3
3	2
4	1
5	0

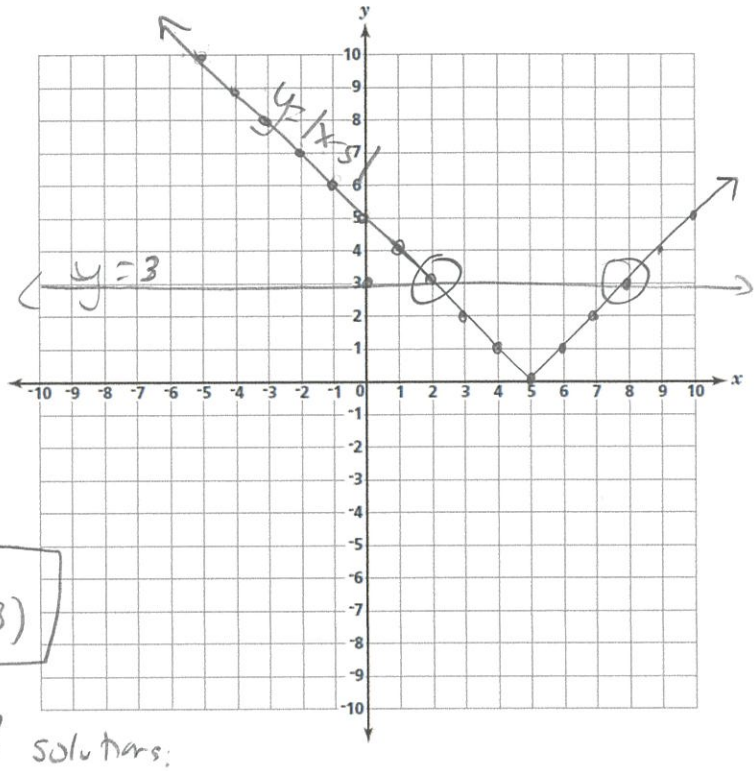
x	y
6	1
7	2
8	3
9	4
10	5

linear

$y = 3$

$m = 0$

$B = 3$



Solutions:

$(2, 3)$ & $(8, 3)$

x-values of solutions:

$x = 2$ & $x = 8$

2) $y = 3|x-2|+1$
$y = 7$

* use arrows b/c NO constraints given *

abs. value → right 2 → up 1

narrower by 3

$y = 3|x-2|+1$

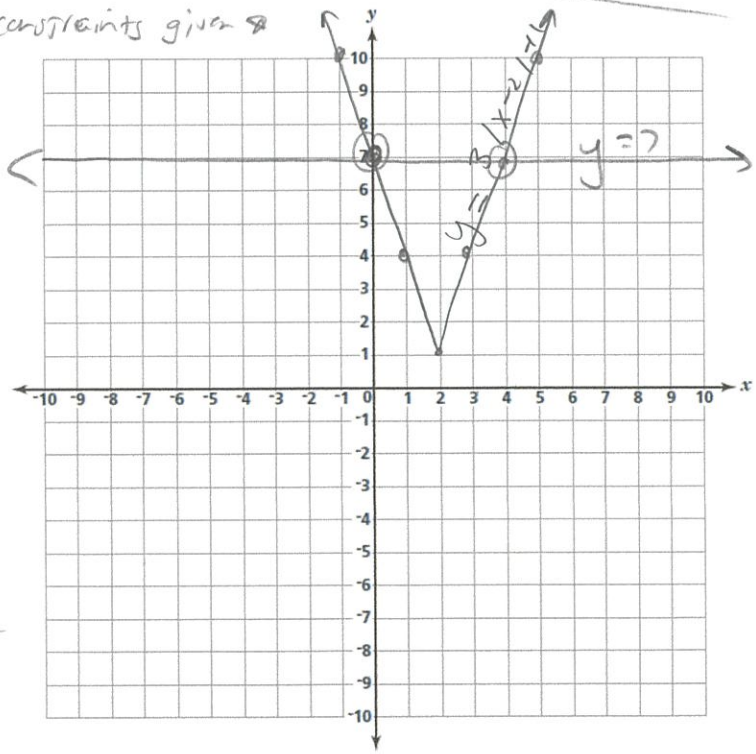
x	y
-1	10
0	7
1	4
2	1
3	4
4	7
5	10

linear

$y = 7$

$m = 0$

$B = 7$



Solutions:

$(0, 7)$ & $(4, 7)$

x-values of solutions

$x = 0$ & $x = 4$