9.8

* **Bell Ringer:**

Review solving a system by elimination
pg. 594 # 35-37

35)
$$\begin{aligned} x+y&=10 \\ -\;x-y&=2 \\ \hline +2y&=8 \end{aligned}$$
$\div 2$

$y=+4$

$x+y=10$

$x+4=10$

$x=6$

$(6,4)$

36)
$$\begin{aligned} 5x-6y&=-32 \\ +\;3x+6y&=48 \\ \hline 8x&=16 \end{aligned}$$
8

$x=2$

$3x+6y=48$

$6+6y=48$

$\dfrac{6y=42}{6}$

$y=7$

$(2,7)$

37)
$-2x+15y=-32$

$3(7x-5y=17)$

$$\begin{aligned} -2x+15y&=-32 \\ +\;21x-15y&=51 \\ \hline 19x&=19 \end{aligned}$$

$x=1$

$-2x+15y=-32$

$-2+15y=-32$

$15y=-30$

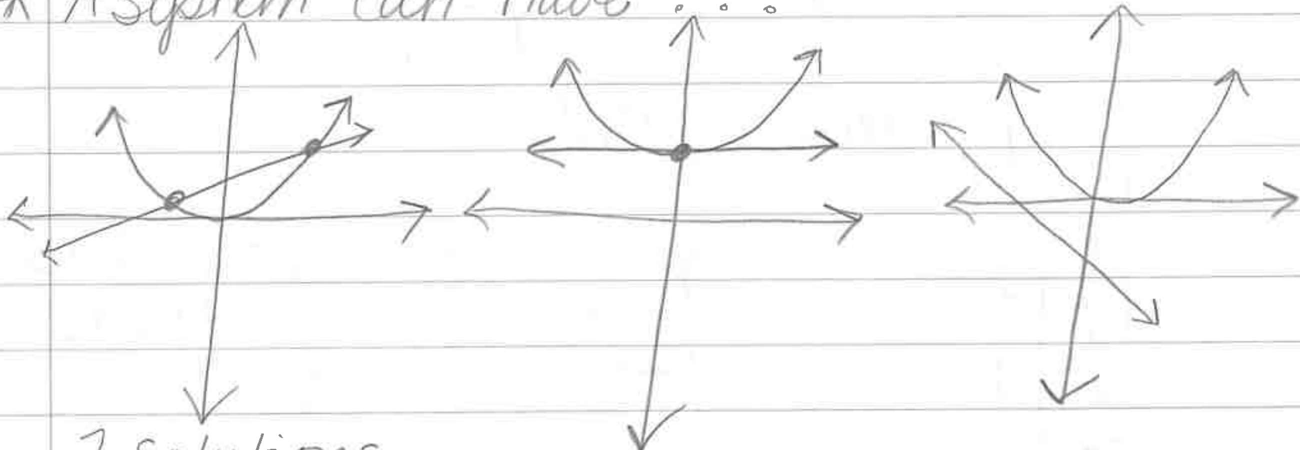
$y=-2$

$(1,-2)$

9.8 Systems of Linear & Quadratic Equations

* You can solve system of linear & quadratic equations graphically & algebraically

* A system can have . . .



2 solutions   1 solution   No solution

* Remember a solution is an ordered pair(s) that satisfies BOTH equations (where the equations overlap/intersect on a graph)

* Review Problem 1 on pg. 596

* Got it 1) A) $y = 2x^2 + 1$

• $\frac{-b}{2a} = \frac{0}{2(2)} = 0$ $(0,1)$

• $y = 2(1)^2 + 1$
$y = 2(1) + 1$
$y = 2 + 1$
$y = 3$ $(1,3)$

* Got it # 1 on pg. 597

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

$\frac{-b}{2a} = \frac{-1}{2(1)} = \frac{-1}{2}$

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

$y = \left(-\frac{1}{2}\right)^2 - \frac{1}{2} + 3$

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

$y = 2\frac{3}{4}$

$\left(-\frac{1}{2}, 2\frac{3}{4}\right)$

y-intercept, (0, 3)

x	y
1	5
2	9
-2	5

$y = 1^2 + 1 + 3$

$y = 1 + 1 + 3$

$y = 5$

$y = 2^2 + 2 + 3$

$y = 4 + 2 + 3$

$y = 9$

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

$y = 4 - 2 + 3$

$y = 2 + 3$

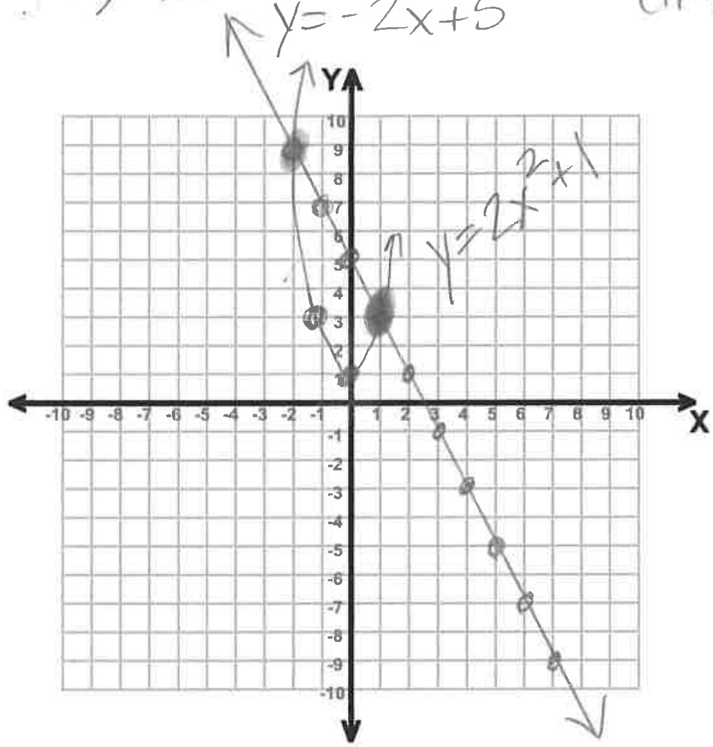
$y = 5$

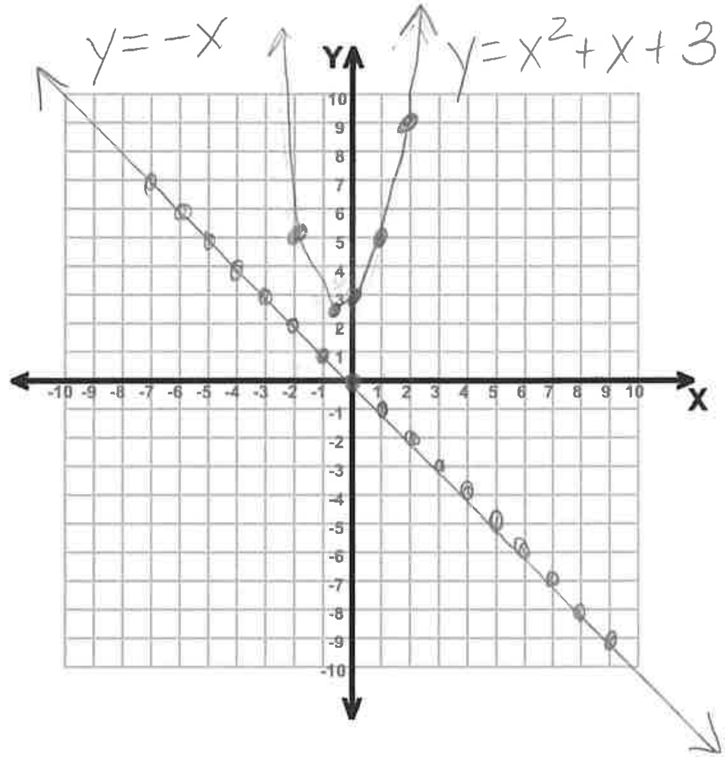
* Proves graphing is <u>NOT</u> the best method in solving a Quadratic

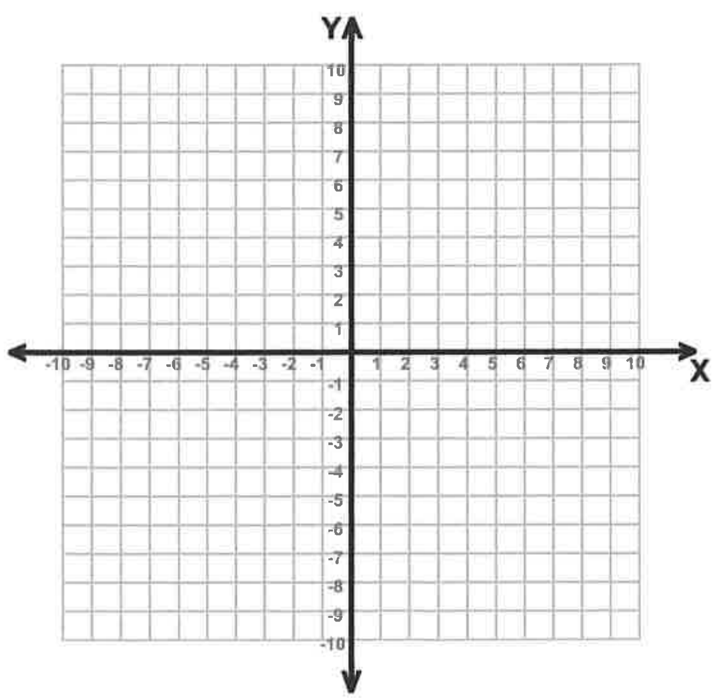
Got it #1

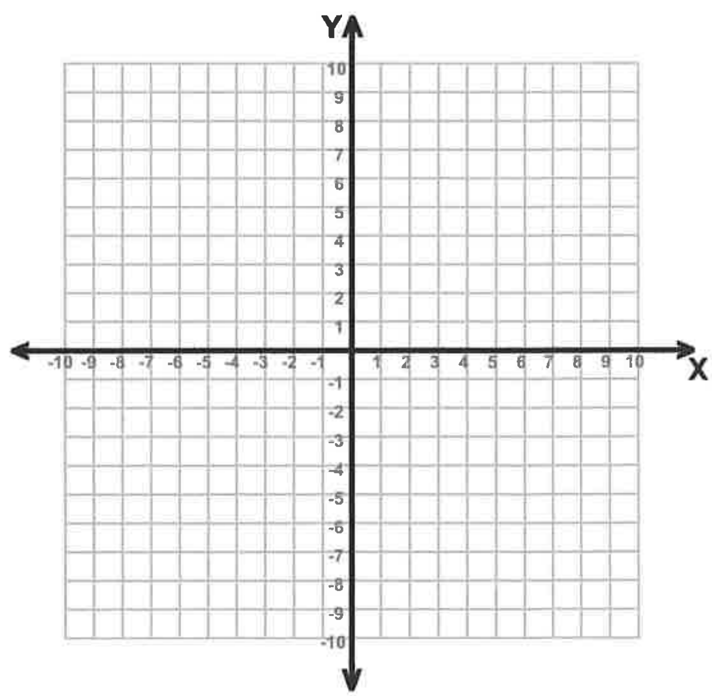
A) Two Solutions @ (-2,9) & (1,3)

B) No Solution









* Solve by elimination (Problem 2) or substitution (Problem 3)

* Review Problem 2 on pg. 597

* Got it 2)

*The "y" term is easiest to eliminate since the x is squared.

$$\begin{array}{lrl} \text{Pool B:} & y = & -x^2+39x+64 \\ \text{Pool A:} & -\ y = & 36x+54 \\ \hline & 0 = & -x^2+3x+10 \\ & 0 = & -(x^2-3x-10) \\ & 0 = & -(x+2)(x-5) \end{array}$$

$x=-2$ & 5

* The attendance was the same Day 5 with 234 people.

$y=36(5)+54$
$y=180+54$
$y=234$

$y=-(5)^2+39(5)+64$
$y=-25+195+64$
$y=234$

* Review Problem 3 on pg. 598

* Got it 3)

$y-30=12x$
$y=x^2+11x-12$

$x^2+11x-12-30=12x$
$x^2+11x-42=12x$
$x^2-1x-42=0$
$(x-7)(x+6)=0$
$x=7$ & -6

Now find the ordered pairs $\Longrightarrow$

$x = 7$

$y - 30 = 12x$

$y - 30 = 12(7)$

$y - 30 = 84$

$+30 \quad +30$

$y = 114$

$(7, 114)$

$x = -6$

$y - 30 = 12(-6)$

$y - 30 = -72$

$+30 \quad +30$

$y = -42$

$(-6, -42)$

* Two solutions to this system *

9.8 pg. 599 #7, 8-22 even, 17, 33, 34

7) The methods for solving are the same:
graphing, elimination & substitution
The # of solutions are slightly different

system of linear	1	many	none
system of linear & quad	1	2	none

8) $y = x^2 + 1$

x	y
0	1
1	2
-1	2
2	5

Two solutions @ (0,1) & (1,2)

10) $y = x^2 - 5x - 4$

$\frac{-b}{2a} = \frac{+5}{2(1)} = \frac{+5}{2} = +2\frac{1}{2}$

x	y
$+2\frac{1}{2}$	$-10\frac{1}{4}$
0	-4
1	-8
2	-10
3	-10
4	-8
5	-4
6	2

One solution @ (4, -8)

$y = 6^2 - 5(6) - 4$
$y = 36 - 30 - 4$
$y = 6 - 4$
$y = 2$

12) $y = x^2 + 2x + 5$

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

$\frac{-b}{2a} = \frac{-2}{2(1)} = -1$

One solution (-2, 5)

14) $y = -x + 3$

$y = x^2 + 1$

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

$+x \quad +x$

$x^2 + x + 1 = 3$

$-3 \quad -3$

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

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

$x = -2$ & 1

$y = -x + 3$

$y = -(-2) + 3$

$y = 2 + 3$

$y = 5$

$(-2, 5)$

$y = -x + 3$

$y = -1 + 3$

$y = 2$

$(1, 2)$

16) $y = -x - 7$

$y = x^2 - 4x - 5$

$x^2 - 4x - 5 = -x - 7$

$+x \quad +x$

$x^2 - 3x - 5 = -7$

$+7 \quad +7$

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

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

$x = 2, 1$

$y = -x - 7$

$y = -2 - 7$

$y = -9$

$(2, -9)$

$y = -x - 7$

$y = -1 - 7$

$y = -8$

$(1, -8)$

17) $y = -x^2 + 200x + 20$
$- \; y = 191x - 32$

$0 = -x^2 + 9x + 52$
$0 = -(x^2 - 9x - 52)$
$0 = -(x+4)(x-13)$

$x = -4, 13$

Day 13

$y = 191x - 32$
$y = 191(13) - 32$
$y = 2,451$ players of each type

18) $y = x^2 - 2x - 6$
$y = 4x + 10$

$x^2 - 2x - 6 = 4x + 10$
$-4x \qquad -4x$
$x^2 - 6x - 6 = 10$
$-16 \;\; -10$

$x^2 - 6x - 16 = 0$
$(x+2)(x-8) = 0$
$x = -2, 8$

$y = 4x + 10$
$y = 4(-2) + 10$
$y = -8 + 10$
$y = 2$ $(-2, 2)$

$y = 4x + 10$
$y = 4(8) + 10$
$y = 32 + 10$
$y = 42$ $(8, 42)$

20) $y = x^2 + 7x + 100$
$y + 10x = 30$

$x^2 + 7x + 100 + 10x = 30$
$x^2 + 17x + 70 = 0$
$(x+10)(x+7) = 0$
$x = -10, -7$

$y + 10x = 30$
$y + 10(-10) = 30$
$y + -100 = 30$
$y = 130$
$(-10, 130)$

$y + 10x = 30$
$y + 10(-7) = 30$
$y - 70 = 30$
$y = 100$
$(-7, 100)$

22) $3x - y = -2$

$2x^2 = y$

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

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

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

$-(2x^2 - 4x + 1x - 2) = 0$

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

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

Factors of ac	Sum of
-4	-3
$-4, +1$	✓

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

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

$(-\frac{1}{2}, \frac{1}{2})$, $(2, 8)$

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

$y = x + 1$

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

$x^2 + x + 3 = 0$

* No factorable

* $\frac{-1 \pm \sqrt{1^2 - 4 \cdot 1 \cdot 3}}{2}$

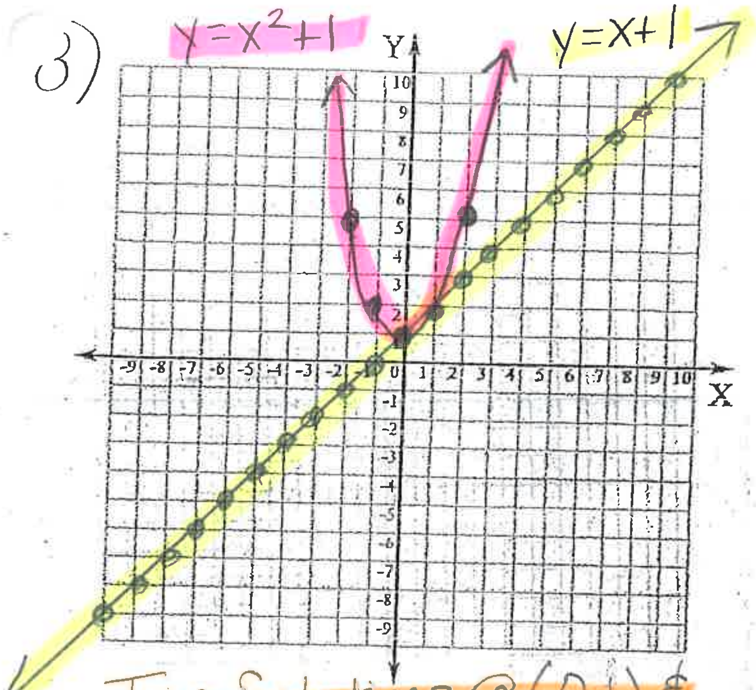
$-1 \pm \sqrt{-}$

No real Solution b/c there is a negative under the radical w/ quadratic formula

34) A line & a parabola intersect in at most 2pts., so a linear-quadratic system can have at most two solutions

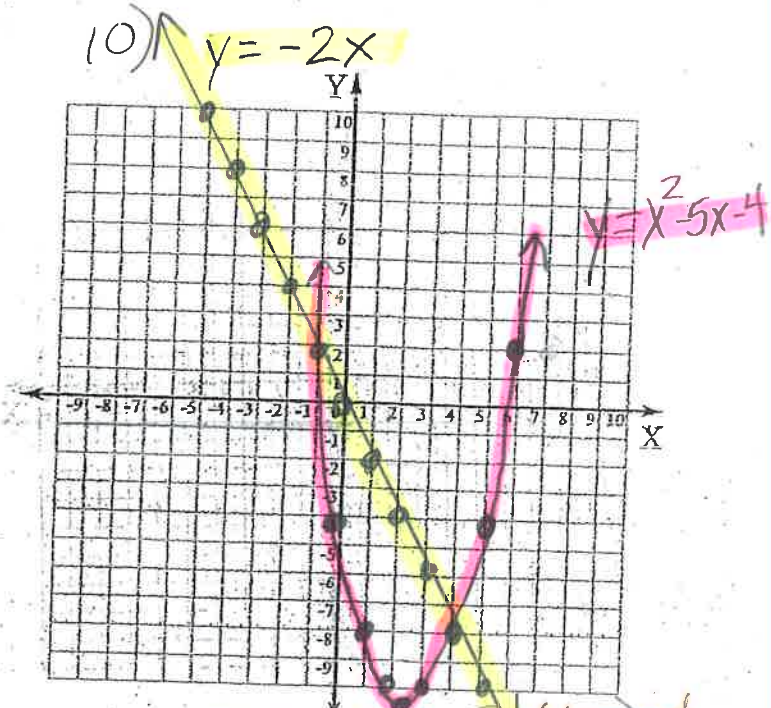
9.8 pg. 599

3)



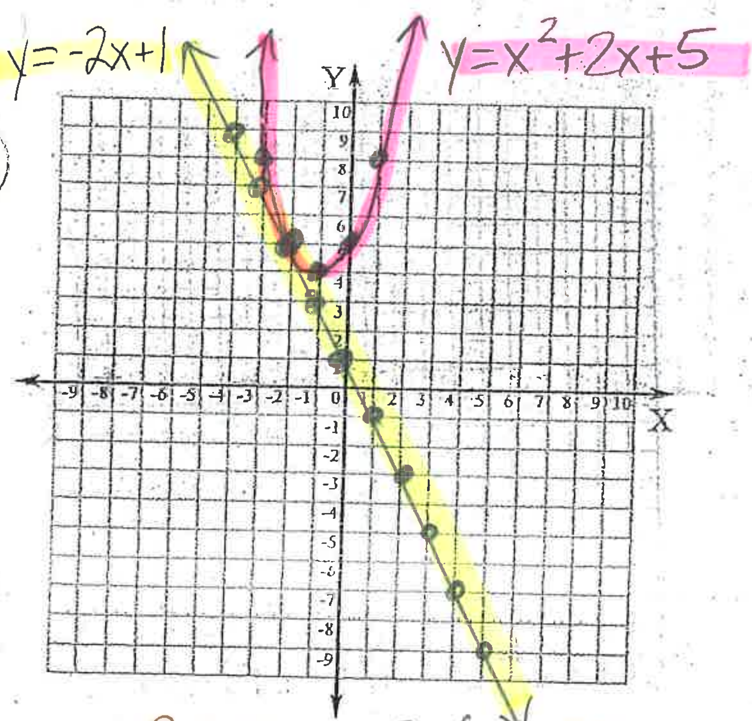
Two Solutions @ (0,1) & (1,2)

10)

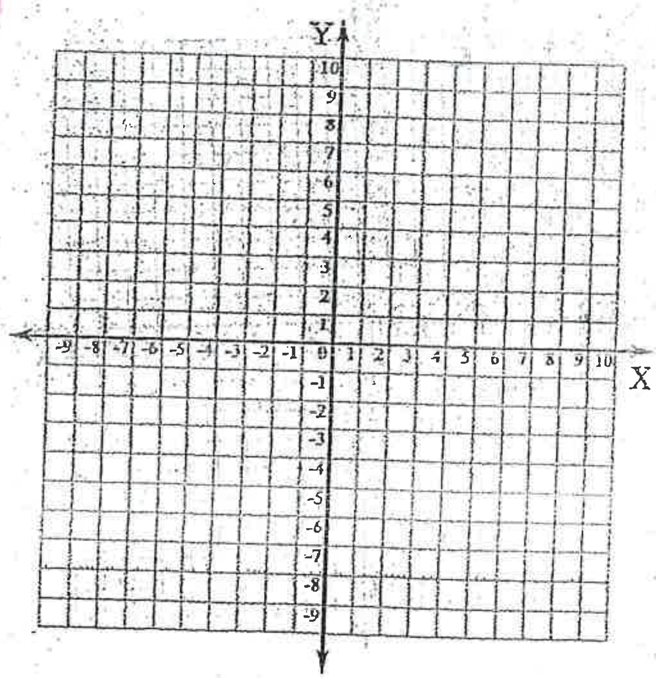


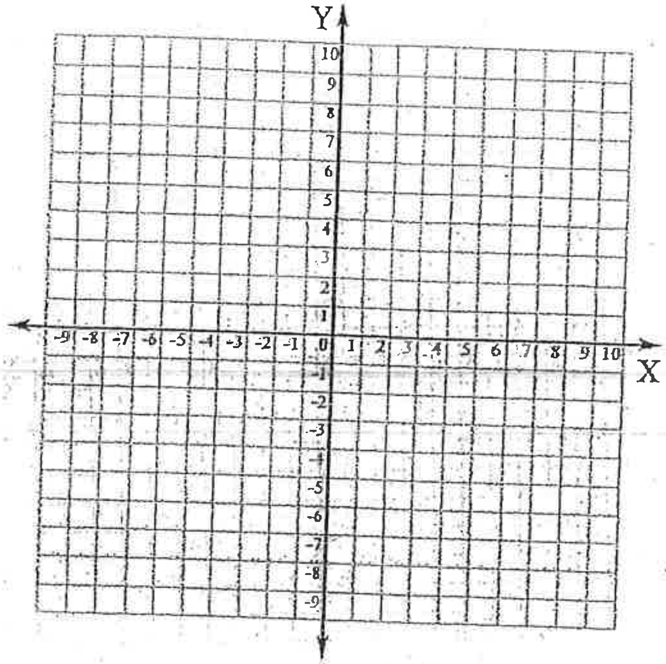
Two Solutions @ (-1,2) & (4,-8)

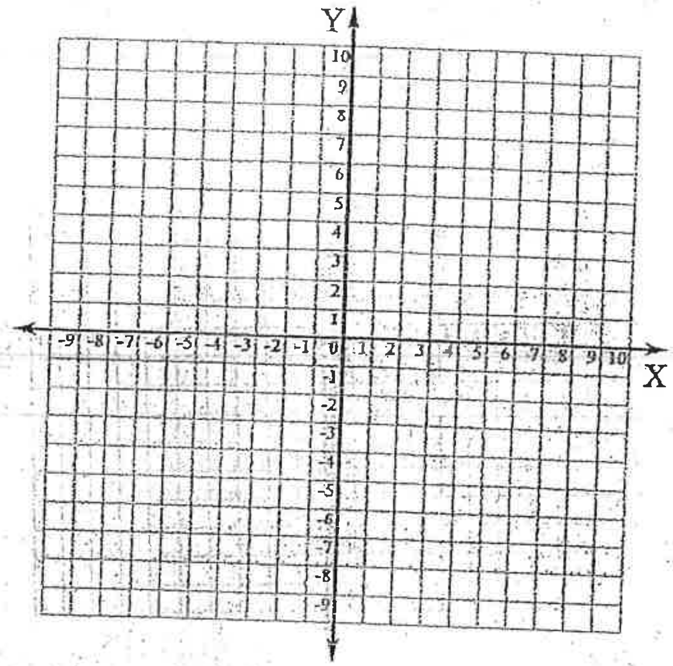
12)

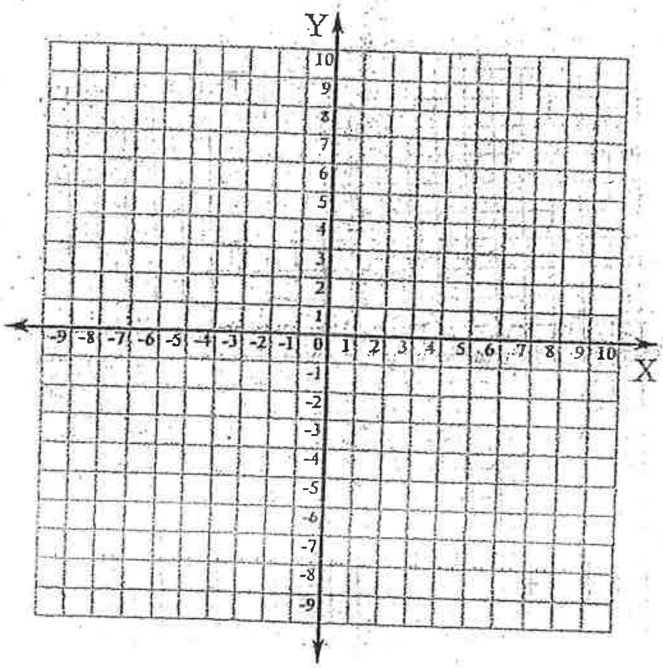


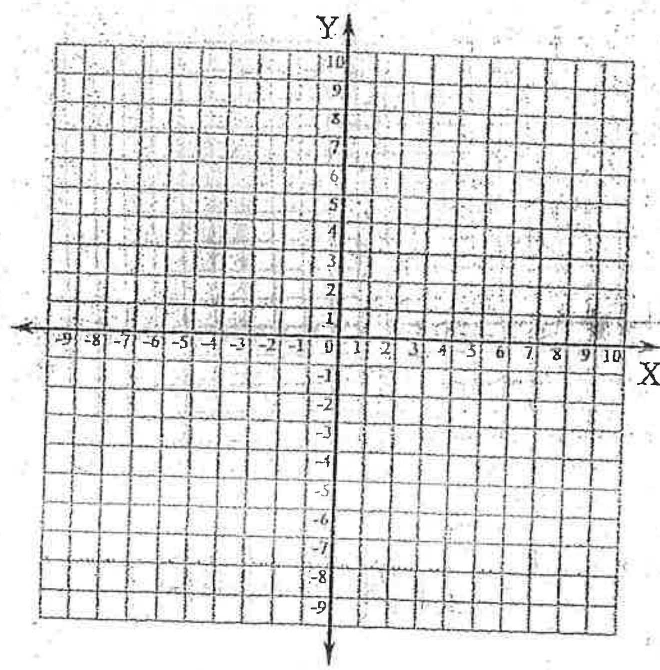
One Solution @ (-2,5)




Y
X
-9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10
10 9 8 7 6 5 4 3 2 1 -1 -2 -3 -4 -5 -6 -7 -8 -9


Y
X
-9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10
10 9 8 7 6 5 4 3 2 1 -1 -2 -3 -4 -5 -6 -7 -8 -9


Y
X
-9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10
10 9 8 7 6 5 4 3 2 1 -1 -2 -3 -4 -5 -6 -7 -8 -9


Y
X
-9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10
10 9 8 7 6 5 4 3 2 1 -1 -2 -3 -4 -5 -6 -7 -8 -9