SEC 6.1 & 6.2 SYSTEMS OF EQUATIONS

1. SUBSTITUTION METHOD

A) SOLVE FOR ONE VARIABLE
(HINT: CHOOSE A VARIABLE WITH A COEFFICIENT OF 1)

B) SUBSTITUTE THE EXPRESSION INTO THE OTHER EQUATION FOR THAT VARIABLE.

C) SOLVE FOR REMAINING VARIABLE

D) BACK-SUBSTITUTE INTO THE EXPRESSION IN (PART A) AND SOLVE FOR THE OTHER VARIABLE

E) CHECK SOLUTION

#7 $x + y^2 = 0$ $\qquad x = -y^2$ $\qquad x = -(-5)^2$
$\qquad -25$

$2x + 5y^2 = 75$

$2(-y^2) + 5y^2 = 75$ $\qquad (-25, -5)$

$-2y^2 + 5y^2 = 75$

$\frac{3y^2}{3} = \frac{75}{3}$ $\qquad (-25, 5)$ $\qquad x = -(5)^2$

$\sqrt{y^2} = \sqrt{25}$

$y = \pm 5$

2. ELIMINATION METHOD

A) ADJUST THE COEFFICIENTS : MULTIPLY BY ONE OR BOTH EQUATIONS SO THAT THE VARIABLE THAT IS TO BE ELIMINATED HAS OPPOSITE COEFFICIENT.

B) ADD EQUATIONS TOGETHER TO ELIMINATE THE VARIABLE.

C) SOLVE FOR REMAINING VARIABLE

D) BACK-SUBSTITUTE INTO EITHER EQUATION AND SOLVE FOR THE ELIMINATED VARIABLE

E) CHECK SOLUTION(S).

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$$\begin{array}{r} -\cancel{x^2} + 2y = -1 \\ + \quad \cancel{x^2} + 5y = 29 \\ \hline 7y = 28 \\ y = 4 \end{array}$$

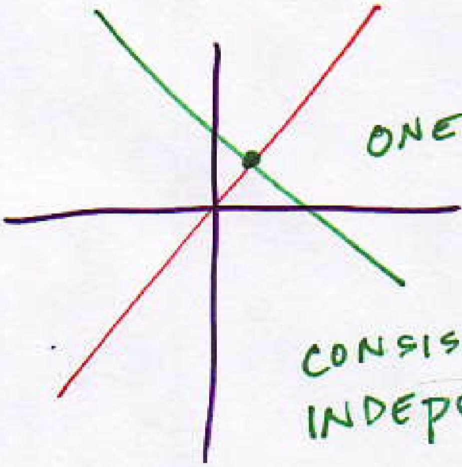
$$x^2 - 2(4) = 1$$
$$x^2 - \cancel{8} = 1$$
$$+\cancel{8} \quad +8$$
$$\sqrt{x^2} = \sqrt{9}$$
$$x = \pm 3$$

$(3, 4)$ $(-3, 4)$

3. GRAPHING METHOD

A) GRAPH BOTH EQUATIONS

B) FIND THE INTERSECTION POINTS

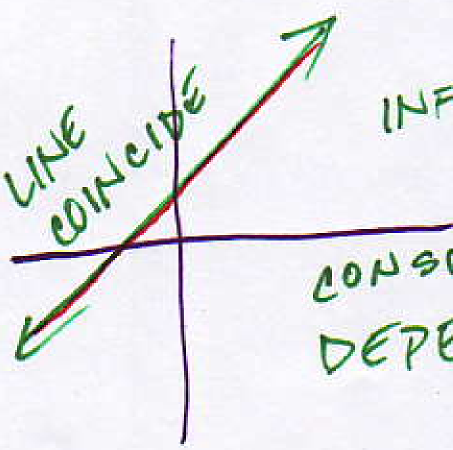


ONE SOLUTION

CONSISTENT (A SOLUTION EXISTS)
INDEPENDENT (TWO SEPARATE LINES)

NO SOLUTION

INCONSISTENT (NO SOLUTION)
INDEPENDENT (TWO SEPARATE LINES)



INFINITELY MANY SOLUTIONS

CONSISTENT (A SOLUTION EXISTS)
DEPENDENT (SAME LINES)

EXAMPLE FOR INFINITELY MANY SOLUTIONS

$8 \quad 8 \quad 8$

$3x - 6y = 12$

$4x - 8y = 16$

$-4 \quad -4 \quad -4$

$\cancel{24x} - \cancel{48y} = \cancel{96}$

$-\cancel{24x} + \cancel{48y} = -\cancel{96}$

$0 = 0$ TRUE

LET $x = t$

$$\boxed{\left(t, \tfrac{1}{2}t - 2 \right)}$$

$\cancel{3(t)} - 6y = 12$

$-\cancel{3t} \qquad -3t$

$\frac{-6y}{-6} = \frac{-3}{-6}t + \frac{12}{-6}$

$y = \frac{1}{2}t - 2$