MA 110 CHAPTER 4: LINEAR EQUATIONS

MA 110 SECTION 4.1: SYSTEMS OF LINEAR EQUATIONS

REVIEW: SUBSTITUTION METHOD

FINDING THE INTERSECTION POINT OF TWO LINES BY THE SUBSTITUTION METHOD:

Example: Solve the following system of equations.

$3x + 9y = 45$
$2x + y = 10$

STEP 1: Solve each equation for y.

$3x + 9y = 45$
$9y = -3x + 45$
$y = -\frac{1}{3}x + 5$

$2x + y = 10$
$y = -2x + 10$

STEP 2: ***SUBSTITUTE*** the solution for y of the first equation into y for the second equation.

$-\frac{1}{3}x + 5 = -2x + 10$

STEP 3: Solve for x.

$3(-\frac{1}{3}x + 5) = 3(-2x + 10)$ *Clear the fraction*
$-x + 15 = -6x + 30$ *Combine like terms*
$5x = 15$ *Isolate x*
$x = 3$ *Solution*

STEP 4: ***SUBSTITUTE*** to find other coordinate of intersection point.

$y = -2x + 10 = -2(3) + 10 = 4$

STEP 5: Write final answer.

The intersection point is (3, 4).

PRACTICE

Solve the following systems of equations using the **SUBSTITUTION METHOD**.

1. $x + 2y = 12$
   $2x + 3y = 19$

2. $x + 3y = 2$
   $3x + 4y = 1$

3. $y = 2 - x$
   $2x - y = 1$

4. $2x - 4y = 8$
   $5x - y = 11$

ANSWERS

1. (2, 5) 2. (-1, 1) 3. (1, 1) 4. (2, -1)