

5-3b Solving Systems by Elimination Continued

- *In some cases, you will need to multiply one or both of the equations by a number so that one variable has OPPOSITE COEFFICIENTS

Examples:

$$1. \begin{cases} x + 2y = 11 \\ -3x + y = -5 \end{cases}$$

$$3 \begin{matrix} \nearrow & \nearrow & \nearrow \\ (x + 2y = 11) \end{matrix}$$

$$3x + 6y = 33$$

$$-3x + y = -5$$

$$\hline 7y = 28$$

$$y = 4$$

$$x + 2y = 11$$

$$x + 2(4) = 11$$

$$x + 8 = 11$$

$$x = 3$$

$$(3, 4)$$

CHECK:

$$x + 2y = 11$$

$$3 + 2(4) = 11$$

$$3 + 8 = 11$$

$$11 = 11 \checkmark$$

$$-3x + y = -5$$

$$-3(3) + 4 = -5$$

$$-9 + 4 = -5$$

$$-5 = -5 \checkmark$$

$$2. \begin{cases} 7x - 2y = -12 \\ 14x - 6y = -22 \end{cases}$$

$$-2 \begin{matrix} \nearrow & \nearrow & \nearrow \\ (7x - 2y = -12) \end{matrix}$$

$$-14x + 4y = 24$$

$$14x - 6y = -22$$

$$\hline -2y = 2$$

$$y = -1$$

$$7x - 2y = -12$$

$$7x - 2(-1) = -12$$

$$7x + 2 = -12$$

$$\hline 7x = -14$$

$$x = -2$$

$$\boxed{(-2, -1)}$$

$$3. \begin{cases} 2x + 5y = 26 \\ -3x - 4y = -25 \end{cases}$$

$$3(2x + 5y = 26)$$

$$\textcircled{1} 6x + 15y = 78$$

$$2(-3x - 4y = -25)$$

$$\textcircled{2} -6x - 8y = -50$$

$$\begin{array}{r} 6x + 15y = 78 \\ -6x - 8y = -50 \\ \hline 7y = 28 \\ \underline{7} \quad \underline{7} \end{array}$$

$$y = 4$$

$$2x + 5y = 26$$

$$2x + 5(4) = 26$$

$$2x + 20 = 26$$

$$\begin{array}{r} -20 \quad -20 \\ \hline 2x = 6 \\ \underline{2} \end{array}$$

$$x = 3$$

$$\boxed{(3, 4)}$$

$$4. \begin{cases} 9x + 9y = 27 \\ -4x + 2y = 12 \end{cases}$$

$$4(9x + 9y = 27)$$

$$\textcircled{1} 36x + 36y = 108$$

$$9(-4x + 2y = 12)$$

$$\textcircled{2} -36x + 18y = 108$$

$$\begin{array}{r} 36x + 36y = 108 \\ -36x + 18y = 108 \\ \hline 54y = 216 \\ \underline{54} \quad \underline{54} \end{array}$$

$$y = 4$$

$$9x + 9y = 27$$

$$9x + 9(4) = 27$$

$$9x + 36 = 27$$

$$\begin{array}{r} -36 \quad -36 \\ \hline 9x = -9 \\ \underline{9} \quad \underline{9} \end{array}$$

$$x = -1$$

$$\boxed{(-1, 4)}$$

$$9x + 9y = 27 \quad -4x + 2y = 12$$

$$9(-1) + 9(4) = 27 \quad -4(-1) + 2(4) = 12$$

$$-9 + 36 = 27 \quad 4 + 8 = 12$$

$$27 = 27 \checkmark \quad 12 = 12 \checkmark$$