

## 8.5b Solving Systems by Elimination: Part II

Math 10

### Solving Systems of Linear Equations Algebraically Elimination Method: Part II

Consider the following system:

$$\begin{aligned} 2x + 4y &= 9 \\ (x + 3y &= -1) \times 2 \end{aligned}$$

Since neither variable has the same coefficient in both equations, we first need to multiply one (or both) equations. Then follow the steps from the previous lesson.

$$\begin{aligned} 2x + 4y &= 9 \\ \ominus 2x + 6y &= -2 \\ \hline -2y &= 11 \\ y &= -\frac{11}{2} \\ 2x + 4\left(-\frac{11}{2}\right) &= 9 \\ 2x - 22 &= 9 \\ +22 \quad +22 & \\ 2x &= 31 \\ x &= \frac{31}{2} \\ \text{solution: } &\left(\frac{31}{2}, -\frac{11}{2}\right) \end{aligned}$$

Solve each system of linear equations by elimination. Verify your answer.

a)  $(-3x + 7y = -16) \times 3$

$$\begin{aligned} -9x + 5y &= 16 \\ \ominus -9x + 21y &= -48 \end{aligned}$$

$$\begin{aligned} -16y &= 64 \\ \div -16 \quad \div -16 & \\ y &= -4 \end{aligned}$$

$$-3x + 7(-4) = -16$$

$$\begin{aligned} -3x - 28 &= -16 \\ +28 \quad +28 & \end{aligned}$$

$$\begin{aligned} -3x &= 12 \\ x &= -4 \end{aligned}$$

**solution: (-4, -4)**

check:

$$\begin{aligned} \textcircled{1} \text{ LS} &= -3(-4) + 7(-4) & \textcircled{2} \text{ LS} &= -9(-4) + 5(-4) \\ &= 12 - 28 & &= 36 - 20 \\ &= -16 & &= 16 \\ &= \text{RS} & &= \text{RS} \end{aligned}$$

b)  $(x + 7y = -14) \times 2$

$$\begin{aligned} -4x - 14y &= 28 \\ \oplus 2x + 14y &= -28 \end{aligned}$$

$$\begin{aligned} -2x &= 0 \\ x &= 0 \end{aligned}$$

$$\begin{aligned} 0 + 7y &= -14 \\ y &= -2 \end{aligned}$$

**solution: (0, -2)**

check:

$$\begin{aligned} \textcircled{1} \text{ LS} &= 0 + 7(-2) \\ &= 0 + -14 \\ &= -14 \\ &= \text{RS} \\ \textcircled{2} \text{ LS} &= -4(0) - 14(-2) \\ &= 0 + 28 \\ &= 28 \\ &= \text{RS} \end{aligned}$$

**Assignment: handout**