

Self-Check 15

Solving Systems of Linear Equations

1. Use a graphing calculator, estimate the solution (point of intersection) for this system of linear equations :

$$\begin{cases} 3.42x - 7.8y = 4.74 \\ 1.23x + 1.45y = 3.97 \end{cases}$$

3. Solve by elimination and check your solution:

$$\begin{cases} x + y = -1 \\ 6x + 5y = -23 \end{cases}$$

5. What can be determined about the system of linear equations below without working out the solution? Does this system have one solution, infinite solutions, or no solution? Find the solution, if it exists.

$$\begin{cases} 5x - y = 6 \\ y = -5x + 6 \end{cases}$$

2. Solve by substitution and check your solution:

$$\begin{cases} 3x + y = 6 \\ 5x + 7y = -22 \end{cases}$$

4. Solve by any method and check your solution:

$$\begin{cases} y = 0.5x + 3 \\ y = 0.49x + 20 \end{cases}$$

6. A student paid \$3.75 for lunch with 30 coins. If all of the coins were quarters and dimes, how many coins were there of each type? Set up a system of linear equations and solve by any method.

Solutions to Self-Check 15 Solving Systems of Linear Equations

1. Use a graphing calculator, estimate the solution (point of intersection) for this system of linear equations :

$$\begin{cases} 3.42x - 7.8y = 4.74 \\ 1.23x + 1.45y = 3.97 \end{cases}$$

Point of intersection (1.68, 1.30)

3. Solve by elimination and check your solution:

$$\begin{cases} x + y = -1 \\ 6x + 5y = -23 \end{cases}$$

Solution is (-18, 17)

5. What can be determined about the system of linear equations below without working out the solution? Does this system have one solution, infinite solutions, or no solution? Find the solution, if it exists.

$$\begin{cases} 5x - y = 6 \\ y = -5x + 6 \end{cases}$$

Answer: When both equations are solved for y , the slopes of the lines (coefficient of x) are not the same. Therefore, the equations cannot represent the same line (same slope and infinite number of solutions) or parallel lines (same slope, but no intersection). This system of linear equations has one intersection (one solution) at the point (1.2, 0).

2. Solve by substitution and check your solution:

$$\begin{cases} 3x + y = 6 \\ 5x + 7y = -22 \end{cases}$$

Solution is at $x = 4$ and $y = -6$.

4. Solve by any method and check your solution:

$$\begin{cases} y = 0.5x + 3 \\ y = 0.49x + 20 \end{cases}$$

Solution is (1700, 853).

Note: This system is difficult to solve by graphing. The lines appear parallel because the slopes are almost equal.

6. A student paid \$3.75 for lunch with 30 coins. If all of the coins were quarters and dimes, how many coins were there of each type? Set up a system of linear equations and solve by any method.

Answer: Let x = number of quarters,
 y = number of dimes

$$\begin{cases} .25x + .10y = 3.75 \\ x + y = 30 \end{cases}$$

Solution is $x = 5$, $y = 25$, or the student paid for lunch with 5 quarters and 25 dimes.