

# 11.1 Systems of Linear Equations

## Substitution Method

In this method you will take one equation and solve for either  $x$  or  $y$ . Then you will substitute this into the other equation.

EXAMPLE: Solve the system using the substitution method:

$$\begin{aligned} 3x - y &= 11 \\ -2x + 5y &= -16 \end{aligned}$$

EXAMPLE: Solve the system using the substitution method:

$$\begin{aligned} 3x + 2y &= -9 \\ 2x - 4y &= -6 \end{aligned}$$

**Elimination Method**

In this method we will multiply one or both of the equations by something so that when we add the equations together one of the variables will be eliminated.

EXAMPLE: Solve the system using the elimination method:

$$\begin{array}{r} 2x + 3y = -4 \\ 5x - 6y = -37 \end{array}$$

EXAMPLE: Solve the system using the elimination method:

$$\begin{array}{r} 3x + 4y = -11 \\ 5x + 3y = -11 \end{array}$$

EXAMPLE: Solve the system using any method:

$$\begin{aligned} \frac{2}{3}x - y &= \frac{20}{3} \\ 2x - \frac{5}{2}y &= 17 \end{aligned}$$

EXAMPLE: Solve the system using any method:

$$\begin{aligned} 3x - y &= 4 \\ 6x - 2y &= 7 \end{aligned}$$

EXAMPLE: A party mix is made by adding nuts that sell for \$2.50 per kg to a cereal mixture that sells for \$1 per kg. How much of each should be added to get 30 kg of a mix that will sell for \$1.70 per kg.

	Number of Kilograms	Price per Kilogram	Value
Nuts			
Cereal			
Mixture			

EXAMPLE: A chemist working on a flu vaccine needs to mix a 10% sodium-iodine solution with a 60% sodium-iodine solution to obtain 50 ml of a 30% sodium-iodine solution. How many ml of each should be mixed?

	Number of ml	Percent (as a decimal)	Amount of Sodium-iodine
10% solution			
60% solution			
30% solution mixture			