11.1 Systems of Linear Equations: Substitution and Elimination

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: $\begin{array}{l} 3x - y = 11 \\ -2x + 5y = -16 \end{array}$.

EXAMPLE: Solve the system using the substitution method: $\begin{array}{l} 3x + 2y = -9 \\ 2x - 4y = -6 \end{array}$.

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

EXAMPLE: Solve the system using the elimination method: $\begin{array}{l} 3x + 4y = -11 \\ 5x + 3y = -11 \end{array}$.

EXAMPLE: Solve the system using any method:
$$\dfrac{2}{3}x - y = \dfrac{20}{3}$$
$$2x - \dfrac{5}{2}y = 17$$
.

EXAMPLE: Solve the system using any method:
$$3x - y = 4$$
$$6x - 2y = 7$$
.

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			