Review Exercise Set 22

Exercise 1: Determine the solution of the following system of equations by using the addition method.

\[
\begin{align*}
\ x - 4y &= 12 \\
2x + 5y &= -2
\end{align*}
\]

Exercise 2: Determine the solution of the following system of equations by using the addition method.

\[
\begin{align*}
3x + 10y &= -33 \\
6x - 7y &= 15
\end{align*}
\]

Exercise 3: Determine the solution of the following system of equations by using the addition method.

\[
\begin{align*}
3x + y &= -9 \\
4x - 3y &= 1
\end{align*}
\]
Exercise 4: Determine the solution of the following system of equations by using the addition method.

\[-x + 2y = 10\]
\[3x - y = -10\]

Exercise 5: Determine the solution of the following system of equations by using the addition method.

\[6x - 5y = 1\]
\[4x - 7y = 2\]
Review Exercise Set 22 Answer Key

Exercise 1: Determine the solution of the following system of equations by using the addition method.

\[
\begin{align*}
x - 4y &= 12 \\
2x + 5y &= -2
\end{align*}
\]

Multiply the first equation by -2

\[
\begin{align*}
-2(x - 4y) &= -2(12) \\
-2x + 8y &= -24
\end{align*}
\]

Add the new equation to the second equation to eliminate x and solve for y

\[
\begin{align*}
2x + 5y &= -2 \\
-2x + 8y &= -24 \\
13y &= -26 \\
y &= -2
\end{align*}
\]

Substitute the value of y into one of the original equations to find x

\[
\begin{align*}
x - 4y &= 12 \\
x - 4(-2) &= 12 \\
x + 8 &= 12 \\
x &= 12 - 8 \\
x &= 4
\end{align*}
\]

The solution for the system of equations is \((4, -2)\).

Exercise 2: Determine the solution of the following system of equations by using the addition method.

\[
\begin{align*}
3x + 10y &= -33 \\
6x - 7y &= 15
\end{align*}
\]

Multiply the first equation by -2

\[
\begin{align*}
-2(3x + 10y) &= -2(-33) \\
-6x - 20y &= 66
\end{align*}
\]

Add the new equation to the second equation to eliminate x and solve for y

\[
\begin{align*}
6x - 7y &= 15 \\
-6x - 20y &= 66 \\
-27y &= 81 \\
y &= -3
\end{align*}
\]
Exercise 2 (Continued):

Substitute the value of y into one of the original equations to find x

\[3x + 10y = -33\]
\[3x + 10(-3) = -33\]
\[3x - 30 = -33\]
\[3x = -33 + 30\]
\[3x = -3\]
\[x = -1\]

**The solution for the system of equations is (-1, -3).**

Exercise 3: Determine the solution of the following system of equations by using the addition method.

\[3x + y = -9\]
\[4x - 3y = 1\]

Multiply the first equation by 3

\[3(3x + y = -9)\]
\[9x + 3y = -27\]

Add the new equation to the second equation to eliminate y and solve for x

\[4x - 3y = 1\]
\[9x + 3y = -27\]
\[13x = -26\]
\[x = -2\]

Substitute the value of x into one of the original equations to find y

\[3x + y = -9\]
\[3(-2) + y = -9\]
\[-6 + y = -9\]
\[y = -9 + 6\]
\[y = -3\]

**The solution for the system of equations is (-2, -3).**
Exercise 4: Determine the solution of the following system of equations by using the addition method.

\[-x + 2y = 10\]
\[3x - y = -10\]

Multiply the first equation by 3

\[3(-x + 2y = 10)\]
\[-3x + 6y = 30\]

Add the new equation to the second equation to eliminate x and solve for y

\[3x - y = -10\]
\[-3x + 6y = 30\]
\[5y = 20\]
\[y = 4\]

Substitute the value of y into one of the original equations to find x

\[3x - y = -10\]
\[3x - (4) = -10\]
\[3x = -10 + 4\]
\[3x = -6\]
\[x = -2\]

The solution for the system of equations is \((-2, 4)\).

Exercise 5: Determine the solution of the following system of equations by using the addition method.

\[6x - 5y = 1\]
\[4x - 7y = 2\]

Multiply the first equation by 2

\[2(6x - 5y = 1)\]
\[12x - 10y = 2\]

Multiply the second equation by -3

\[-3(4x - 7y = 2)\]
\[-12x + 21y = -6\]
Exercise 5 (Continued):

Add the two new equations together to eliminate $x$ and solve for $y$

\[
\begin{align*}
12x - 10y &= 2 \\
-12x + 21y &= -6
\end{align*}
\]

\[11y = -4\]

\[y = -\frac{4}{11}\]

Substitute the value of $y$ into one of the original equations to find $x$

\[6x - 5y = 1\]

\[6x - 5\left(-\frac{4}{11}\right) = 1\]

\[6x + \frac{20}{11} = 1\]

\[11\left(6x + \frac{20}{11}\right) = 11(1)\]

\[66x + 20 = 11\]

\[66x = 11 - 20\]

\[66x = -9\]

\[x = -\frac{9}{66}\]

\[x = -\frac{3}{22}\]

The solution for the system of equations is \(\left(\frac{-3}{22}, \frac{-4}{11}\right)\).