4.2.6 - Simultaneous Equations II

4.2 - Algebra - Solving Equations

Leaving Certificate Mathematics

Higher Level ONLY

Example 1

Q. Find the intersection point (x, y, z) of:

$$\begin{aligned}
3x + 4y - 2z &= -6 \\
x + 5y - 3z &= -15 \\
-2x + 2y + 4z &= 10
\end{aligned}$$

Example 1

Q.   Find the intersection point (x, y, z) of:

$$3x + 4y - 2z = -6$$
$$x + 5y - 3z = -15$$
$$-2x + 2y + 4z = 10$$

Answer:

Example 1

Q. Find the intersection point (x, y, z) of:

$$3x + 4y - 2z = -6$$
$$x + 5y - 3z = -15$$
$$-2x + 2y + 4z = 10$$

Answer:

$$3x + 4y - 2z = -6$$

Example 1

Q. Find the intersection point (x, y, z) of:

$$
\begin{aligned}
3x + 4y - 2z &= -6 \\
x + 5y - 3z &= -15 \\
-2x + 2y + 4z &= 10
\end{aligned}
$$

Answer:

$$
\begin{aligned}
3x + 4y - 2z &= -6 \\
x + 5y - 3z &= -15
\end{aligned}
$$

Example 1

Q. Find the intersection point (x, y, z) of:

$$
\begin{aligned}
3x + 4y - 2z &= -6 \\
x + 5y - 3z &= -15 \\
-2x + 2y + 4z &= 10
\end{aligned}
$$

Answer:

$$
\begin{aligned}
3x + 4y - 2z &= -6 \\
x + 5y - 3z &= -15 \\
3x + 4y - 2z &= -6
\end{aligned}
$$

Example 1

Q. Find the intersection point (x, y, z) of:

$$3x + 4y - 2z = -6$$
$$x + 5y - 3z = -15$$
$$-2x + 2y + 4z = 10$$

Answer:

$$3x + 4y - 2z = -6$$
$$x + 5y - 3z = -15$$
$$3x + 4y - 2z = -6$$
$$-3x - 15y + 9z = 45$$

Example 1

Q. Find the intersection point (x, y, z) of:

$$3x + 4y - 2z = -6$$
$$x + 5y - 3z = -15$$
$$-2x + 2y + 4z = 10$$

Answer:

$$3x + 4y - 2z = -6$$
$$x + 5y - 3z = -15$$
$$3x + 4y - 2z = -6$$
$$-3x - 15y + 9z = 45$$
$$-11y + 7z = 39$$

Example 1

Q. Find the intersection point (x, y, z) of:

$$\begin{aligned}
3x + 4y - 2z &= -6 \\
x + 5y - 3z &= -15 \\
-2x + 2y + 4z &= 10
\end{aligned}$$

Answer:

$$\begin{aligned}
3x + 4y - 2z &= -6 \\
x + 5y - 3z &= -15 \\
3x + 4y - 2z &= -6 \\
-3x - 15y + 9z &= 45 \\
-11y + 7z &= 39
\end{aligned}$$

Example 1

Q. Find the intersection point (x, y, z) of:

$$3x + 4y - 2z = -6$$
$$x + 5y - 3z = -15$$
$$-2x + 2y + 4z = 10$$

Answer:

$$x + 5y - 3z = -15$$

Example 1

Q.   Find the intersection point (x, y, z) of:

$$3x + 4y - 2z = -6$$
$$x + 5y - 3z = -15$$
$$-2x + 2y + 4z = 10$$

Answer:

$$x + 5y - 3z = -15$$
$$-2x + 2y + 4z = 10$$

Example 1

Q.   Find the intersection point (x, y, z) of:

$$3x + 4y - 2z = -6$$
$$x + 5y - 3z = -15$$
$$-2x + 2y + 4z = 10$$

Answer:

$$x + 5y - 3z = -15$$
$$-2x + 2y + 4z = 10$$
$$2x + 10y - 6z = -30$$

Example 1

Q.   Find the intersection point (x, y, z) of:

$$3x + 4y - 2z = -6$$
$$x + 5y - 3z = -15$$
$$-2x + 2y + 4z = 10$$

Answer:

$$x + 5y - 3z = -15$$
$$-2x + 2y + 4z = 10$$
$$2x + 10y - 6z = -30$$
$$-2x + 2y + 4z = 10$$

Example 1

Q.   Find the intersection point (x, y, z) of:

$$
\begin{aligned}
3x + 4y - 2z &= -6 \\
x + 5y - 3z &= -15 \\
-2x + 2y + 4z &= 10
\end{aligned}
$$

Answer:

$$
\begin{aligned}
x + 5y - 3z &= -15 \\
-2x + 2y + 4z &= 10 \\
2x + 10y - 6z &= -30 \\
-2x + 2y + 4z &= 10 \\
12y - 2z &= -20
\end{aligned}
$$

Example 1

Q. Find the intersection point (x, y, z) of:

$$\begin{aligned}
3x + 4y - 2z &= -6 \\
x + 5y - 3z &= -15 \\
-2x + 2y + 4z &= 10
\end{aligned}$$

Answer:

$$\begin{aligned}
x + 5y - 3z &= -15 \\
-2x + 2y + 4z &= 10 \\
2x + 10y - 6z &= -30 \\
-2x + 2y + 4z &= 10 \\
12y - 2z &= -20 \\
6y - z &= -10
\end{aligned}$$

Example 1

Q. Find the intersection point (x, y, z) of:

$$3x + 4y - 2z = -6$$
$$x + 5y - 3z = -15$$
$$-2x + 2y + 4z = 10$$

Answer:

$$-11y + 7z = 39$$
$$6y - z = -10$$

Example 1

Q. Find the intersection point (x, y, z) of:

$$3x + 4y - 2z = -6$$
$$x + 5y - 3z = -15$$
$$-2x + 2y + 4z = 10$$

Answer:

$$-11y + 7z = 39$$
$$6y - z = -10$$
$$-11y + 7z = 39$$

Example 1

Q. Find the intersection point (x, y, z) of:

$$3x + 4y - 2z = -6$$
$$x + 5y - 3z = -15$$
$$-2x + 2y + 4z = 10$$

Answer:

$$-11y + 7z = 39$$
$$6y - z = -10$$
$$-11y + 7z = 39$$
$$42y - 7z = -70$$

Example 1

Q. Find the intersection point (x, y, z) of:

$$
\begin{aligned}
3x + 4y - 2z &= -6 \\
x + 5y - 3z &= -15 \\
-2x + 2y + 4z &= 10
\end{aligned}
$$

Answer:

$$
\begin{aligned}
-11y + 7z &= 39 \\
6y - z &= -10 \\
-11y + 7z &= 39 \\
42y - 7z &= -70 \\
31y &= -31
\end{aligned}
$$

Example 1

Q. Find the intersection point (x, y, z) of:

$$
\begin{aligned}
3x + 4y - 2z &= -6 \\
x + 5y - 3z &= -15 \\
-2x + 2y + 4z &= 10
\end{aligned}
$$

Answer:

$$
\begin{aligned}
-11y + 7z &= 39 \\
6y - z &= -10 \\
-11y + 7z &= 39 \\
42y - 7z &= -70 \\
31y &= -31 \\
\therefore\ y &= -1
\end{aligned}
$$

Example 1

Q. Find the intersection point (x, y, z) of:

$$3x + 4y - 2z = -6$$
$$x + 5y - 3z = -15$$
$$-2x + 2y + 4z = 10$$

Answer:

$$\text{Sub } y = -1 \text{ into E.}$$
$$6y - z = -10$$

Example 1

Q. Find the intersection point (x, y, z) of:

$$3x + 4y - 2z = -6$$
$$x + 5y - 3z = -15$$
$$-2x + 2y + 4z = 10$$

Answer:

$$\text{Sub } y = -1 \text{ into E.}$$
$$6y - z = -10$$
$$6(-1) - z = -10$$

Example 1

Q. Find the intersection point (x, y, z) of:

$$3x + 4y - 2z = -6$$
$$x + 5y - 3z = -15$$
$$-2x + 2y + 4z = 10$$

Answer:

$$\text{Sub } y = -1 \text{ into E.}$$
$$6y - z = -10$$
$$6(-1) - z = -10$$
$$-6 - z = -10$$

Example 1

Q. Find the intersection point (x, y, z) of:

$$
\begin{aligned}
3x + 4y - 2z &= -6 \\
x + 5y - 3z &= -15 \\
-2x + 2y + 4z &= 10
\end{aligned}
$$

Answer:

$$
\begin{aligned}
\text{Sub } y &= -1 \text{ into E.} \\
6y - z &= -10 \\
6(-1) - z &= -10 \\
-6 - z &= -10 \\
-z &= -4
\end{aligned}
$$

Example 1

Q. Find the intersection point (x, y, z) of:

$$
\begin{aligned}
3x + 4y - 2z &= -6 \\
x + 5y - 3z &= -15 \\
-2x + 2y + 4z &= 10
\end{aligned}
$$

Answer:

$$
\begin{aligned}
\text{Sub } y &= -1 \text{ into E.} \\
6y - z &= -10 \\
6(-1) - z &= -10 \\
-6 - z &= -10 \\
-z &= -4 \\
\therefore z &= 4
\end{aligned}
$$

Example 1

Q. Find the intersection point (x, y, z) of:

$$3x + 4y - 2z = -6$$
$$x + 5y - 3z = -15$$
$$-2x + 2y + 4z = 10$$

Answer:

Sub $y = -1$, $z = 4$ into B.

$$x + 5y - 3z = -15$$

Example 1

Q. Find the intersection point (x, y, z) of:

$$3x + 4y - 2z = -6$$
$$x + 5y - 3z = -15$$
$$-2x + 2y + 4z = 10$$

Answer:

Sub $y = -1, \ z = 4$ into B.

$$x + 5y - 3z = -15$$
$$x + 5(-1) - 3(4) = -15$$

Example 1

Q. Find the intersection point (x, y, z) of:

$$3x + 4y - 2z = -6$$
$$x + 5y - 3z = -15$$
$$-2x + 2y + 4z = 10$$

Answer:

Sub $y = -1$, $z = 4$ into B.

$$x + 5y - 3z = -15$$
$$x + 5(-1) - 3(4) = -15$$
$$x - 5 - 12 = -15$$

Example 1

Q. Find the intersection point (x, y, z) of:

$$3x + 4y - 2z = -6$$
$$x + 5y - 3z = -15$$
$$-2x + 2y + 4z = 10$$

Answer:

Sub $y = -1$, $z = 4$ into B.

$$x + 5y - 3z = -15$$
$$x + 5(-1) - 3(4) = -15$$
$$x - 5 - 12 = -15$$
$$\therefore x = 2$$

$$\therefore \text{ Intersection pt. } = (2, -1, 4)$$