Algebra

Simultaneous Equations

Linear Equations with Three Variables

P2 - Algebra

Solve the following simultaneous equations:-

$$x + y + z = 6$$
$$2x + y - z = 1$$
$$4x - 3y + 2z = 4$$

Solution

Number the equations (i), (ii), and (iii) .....

$x + y + z = 6$ ..... *(i)*

$2x + y - z = 1$ ..... *(ii)*

$4x - 3y + 2z = 4$ ..... *(iii)*

To eliminate the 'z' variable we can add (i) and (ii):

$x + y + z = 6$ *(i)*

$\underline{2x + y - z = 1}$ *(ii)*

$3x + 2y = 7$ *(iv)*

Similarly:-

$4x + 2y - 2z = 2$ *2 x (ii)*

$\underline{4x - 3y + 2z = 4}$ *(iii)*

$8x - y = 6$ *(v)*

Solving for (iv) and (v)

$3x + 2y = 7$ *(iv)*

$\underline{16x - 2y = 12}$ *(v) x 2*

$19x = 19$ ..... so $x = 1$

By substitution $y = 2$ and $z = 3$