

EXERCISES:

The process involved in solving simultaneous equations in THREE variables is to start eliminating one variable at a time, e.g.

Solve these equations simultaneously:

$$x + y + z = 2 \dots\dots\dots (i)$$

$$3x - y - z = 10 \dots\dots\dots (ii)$$

$$x - 2y - 4z = 9 \dots\dots\dots (iii)$$

Firstly, eliminate z using (i) + (ii)

$$4x = 12$$

$$\therefore x = 3$$

Now substitute into all the equations and solve for x and y .

$$3 + y + z = 2 \Rightarrow y + z = -1 \dots\dots\dots (iv)$$

$$3 - 2y - 4z = 9 \Rightarrow 2y + 4z = -6 \dots\dots\dots (v)$$

Now using $2 \times (iv) + (v)$, we have

$$-2z = 4$$

$$\therefore z = -2$$

Now substitute this into (iv) to find y

$$y = 1.$$

Solve the following equations in 3 variables simultaneously:

(1) $x - 5y - z = 13$ (i)
 $2x + y + z = 0$ (ii)
 $-3x + y + 2z = 11$ (iii)

$$x = -1, y = -4, z = 6$$

(2) $4x + y - 8z = 0$ (i)
 $2x + 3y + z = 5$ (ii)
 $-x - y - 2z = 1$ (iii)

$$x = -3, y = 4, z = -1$$

(3) $2x + y + z = -2$ (i)
 $-x + y - 2z = 4$ (ii)
 $5x + 2y - 3z = -12$ (iii)

$$x = -3, y = 3, z = 1$$

(4) $x + 2y - z = 7$ (i)
 $2x + 3y - 4z = 9$ (ii)
 $x - y - 3z = -6$ (iii)

$$x = -0.5, y = 4, z = 0.5$$

(5) $x + y + z = 2$ (i)
 $2x - 3y + 5z = 1$ (ii)
 $-2x + 5y - 7z = -3$ (iii)

$$x = -5, y = 3, z = 4$$

(6) $x - y - z = 4$ (i)
 $2x + y - 4z = 3$ (ii)
 $-x + 2y + 3z = -7$ (iii)

$$x = 1.5, y = -2, z = -0.5$$

(7) $x + y + z = 6$ (i)
 $2x + 3y + z = 13$ (ii)
 $x + 2y - z = 5$ (iii)

$$x = 1, y = 3, z = 2$$

(8) $x - y + z = 10$ (i)
 $4x + 2y - 3z = 8$ (ii)
 $3x - 5y + 2z = 34$ (iii)

$$x = 5, y = -3, z = 2$$