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:

$x+y+z=2$ ..... (i)
$3x-y-z=10$ ..... (ii)
$x-2y-4z=9$ ..... (iii)

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

$4x=12$
$\therefore x=3$

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

$3+y+z=2 \Rightarrow y+z=-1$ ..... (iv)
$3-2y-4z=9 \Rightarrow 2y+4z=-6$ ..... (v)

Now using 2x(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)

$\boxed{x=-1, y=-4, z=6}$

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

$\boxed{x=-3, y=4, z=-1}$

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

$\boxed{x=-3, y=3, z=1}$

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

$\boxed{x=-0.5, y=4, z=0.5}$

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

$\boxed{x=-5, y=3, z=4}$

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

$\boxed{x=1.5, y=-2, z=-0.5}$

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

$\boxed{x=1, y=3, z=2}$

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

$\boxed{x=5, y=-3, z=2}$