6. $\begin{vmatrix} 2 & 1 & -1 \\ 3 & 4 & 1 \\ 2 & -3 & -2 \end{vmatrix}$ $\begin{vmatrix} + & - & + \\ - & + & - \\ + & - & + \end{vmatrix}$

$$+2\begin{vmatrix} 4 & 1 \\ -3 & -2 \end{vmatrix} - 1\begin{vmatrix} 3 & 1 \\ 2 & -2 \end{vmatrix} + (-1)\begin{vmatrix} 3 & 4 \\ 2 & -3 \end{vmatrix}$$

$$2\left(4(-2)-(-3)(1)\right) - 1\left(3(-2)-2(1)\right) - 1\left(3(-3)-2(4)\right)$$

$$2(-8+3) - 1(-6-2) - 1(-9-8)$$

$$-10 + 8 + 17$$

$$15$$

7. $x - 2y + z = 3$
$3x + y - 2z = 1$
$-x - y + 4z = 9$

$$D = \begin{vmatrix} 1 & -2 & 1 \\ 3 & 1 & -2 \\ -1 & -1 & 4 \end{vmatrix}$$
$$x \quad y \quad z$$

$$= 1\begin{vmatrix} 1 & -2 \\ -1 & 4 \end{vmatrix} - (-2)\begin{vmatrix} 3 & -2 \\ -1 & 4 \end{vmatrix} + 1\begin{vmatrix} 3 & 1 \\ -1 & -1 \end{vmatrix}$$

$$= 1(4-2) + 2(12-2) + 1(-3+1)$$

$$= 2 + 20 - 2$$

$$D = 20$$

1
3
-1

$$D_x = \begin{vmatrix} 3 & -2 & 1 \\ 1 & 1 & -2 \\ 9 & -1 & 4 \end{vmatrix} = 3\begin{vmatrix} 1 & -2 \\ -1 & 4 \end{vmatrix} - (-2)\begin{vmatrix} 1 & -2 \\ 9 & 4 \end{vmatrix} + 1\begin{vmatrix} 1 & 1 \\ 9 & -1 \end{vmatrix}$$

$$= 3(4-2) + 2(4+18) + 1(-1-9)$$

$$= 6 + 44 - 10$$

$$= 40$$

$$D_y = \begin{vmatrix} 1 & 3 & 1 \\ 3 & 1 & -2 \\ -1 & 9 & 4 \end{vmatrix} = 1\begin{vmatrix} 1 & -2 \\ 9 & 4 \end{vmatrix} - 3\begin{vmatrix} 3 & -2 \\ -1 & 4 \end{vmatrix} + 1\begin{vmatrix} 3 & 1 \\ -1 & 9 \end{vmatrix}$$

$$= 22 - 3(10) + 1(28)$$

$$= 20$$

$$D_z = \begin{vmatrix} 1 & -2 & 3 \\ 3 & 1 & 1 \\ -1 & -1 & 9 \end{vmatrix} = 1\begin{vmatrix} 1 & 1 \\ -1 & 9 \end{vmatrix} - (-2)\begin{vmatrix} 3 & 1 \\ -1 & 9 \end{vmatrix} + 3\begin{vmatrix} 3 & 1 \\ -1 & -1 \end{vmatrix}$$

$$= 10 + 2(28) + 3(-2)$$

$$= 60$$

$$x = \frac{D_x}{D} = \frac{40}{20} = 2 \qquad y = \frac{D_y}{D} = \frac{20}{20} = 1 \qquad z = \frac{D_z}{D} = \frac{60}{20} = 3$$

$$(2, 1, 3)$$

$D = 20$
$D_x = 40$
$D_y = 20$

$D = 20$
$D_x = 40$
$D_y = 20$
$D_z = 60$