FAQ's

1. What do you mean co-planer lines? Give the condition that lie on the co-planer.

   Answer:

   A set of line that lie on the same plane is called co-planer lines

$$\begin{vmatrix} x-\alpha_1 & y-\beta_1 & z-\gamma_1 \\ l_1 & m_1 & n_1 \\ l_2 & m_2 & n_2 \end{vmatrix} = 0$$

   Is the required condition for two lines be co-planer when both lines in symmetrical

2. Prove that the lines $\frac{x-5}{4} = \frac{y-7}{4} = \frac{z+3}{-5} and \frac{x-8}{7} = \frac{y-4}{1} = \frac{z+3}{-5}$ are he co-planer.

   Answer:

   For the lines $\frac{x-5}{4} = \frac{y-7}{4} = \frac{z+3}{-5} and \frac{x-8}{7} = \frac{y-4}{1} = \frac{z+3}{3}$ (sir correction is there instead of -5 we are 3) to be co-planer we must have

$$\begin{vmatrix} 8-5 & 4-7 & 5+3 \\ 4 & 4 & -5 \\ 7 & 1 & 3 \end{vmatrix} = 0$$

   Or $\begin{vmatrix} 3 & -3 & 8 \\ 4 & 4 & -5 \\ 7 & 1 & 3 \end{vmatrix} = 0$ or 51+41-192=0

   or 0=0 which is true therefore the two lines given are co-planer

3. Show that the lines $\frac{x+4}{3} = \frac{y+6}{5} = \frac{z-1}{5}$ and 3x-2y+2+5=0 =2x+3y+4z-4 are co-planer.

   Answer:

   Any point on the first line is p(3r-4,5r-6,-2r+1), which lie in the plane 3x-2t+z+5=0.

If 3(3r-4)-2(5r-6)+(-2r+1)+5=0 or r=2

The point p will also lie in the plane 2x+3y+4z-4=0.

If 2(3r-4)+3(5r-6)+4(-2r+1)-4=0 or r=2 since the two values of r are equal the given are co-planer.

4. Find the magnitude of the shortest distance between the lines, $\frac{x}{2}=\frac{y}{-3}=\frac{z}{1} and \frac{x-2}{3}=\frac{y-1}{-5}=\frac{z+2}{2}$

Answer:

Let l,m,n be the distance cosines of the shortest distance EF

Therefore EF perpendicular to both AB and CD,

Therefore 2l-3m+n=0, 3l-5m+2n=0

Solving $\frac{l}{1}=\frac{m}{1}=\frac{n}{1}=\frac{\sqrt{(l^2+m^2+n^2)}}{\sqrt{(1+1+1)}}=\frac{1}{\sqrt{3}}$ therefore length of shortest distance=projection of AC and EF

$=(2=0)\frac{1}{\sqrt{3}}+(1-0)\frac{1}{\sqrt{3}}+(-2-0)\frac{1}{\sqrt{3}}=\frac{1}{\sqrt{3}}$

5. What is called skew lines? Give the length of the shortest distance between the lines.

Answer:

Two straight lines which do not lie in one plane are called skew lines.

Length of the shortest distance $=l(x_2-x_1)+m(y_2-y_1)+n(z_2-z_1)$ Where, l,m,n be the direction cosines of the shortest distance.