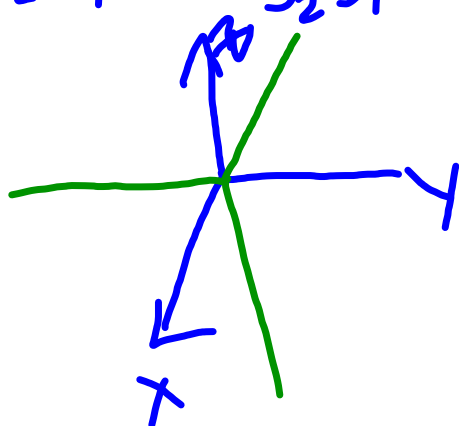


Distance Formula

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$$

(x_1, y_1, z_1)



xy trace \Rightarrow set $z=0$
 xz trace \Rightarrow set $y=0$
 yz trace \Rightarrow set $x=0$

(10) Ex: find the distance between P_1 and P_2 where:

$$P_1 = (0, 0, 0) \text{ and } P_2 = (1, -2, 3)$$

$$d = \sqrt{(1-0)^2 + (-2-0)^2 + (3-0)^2} = \sqrt{1+4+9} = \sqrt{14}$$

(14) Ex: $P_1 = (2, -3, -3)$ and $P_2 = (4, 1, -1)$

Graphing in 3D:

(15) Given $(0, 0, 0)$ $(2, 1, 3)$

Find the direction angles of
 $v = -6i + 12j + 4k$

$$\|v\| = \sqrt{(-6)^2 + (12)^2 + (4)^2} = \sqrt{196} = 14$$

$$\begin{aligned} \cos \alpha &= \frac{-6}{\sqrt{196}} \frac{\sqrt{196}}{\sqrt{196}} & \cos \beta &= \frac{12}{\sqrt{196}} \frac{\sqrt{196}}{\sqrt{196}} & \cos \gamma &= \frac{4}{\sqrt{196}} \frac{\sqrt{196}}{\sqrt{196}} \\ &= \frac{-3}{7} & &= \frac{6}{7} & &= \frac{2}{7} \end{aligned}$$

$$\alpha = 115.4^\circ \quad \beta = 31^\circ \quad \gamma = 73.4^\circ$$

$$v = 14 (\cos 115.4^\circ i + \cos 31^\circ j + \cos 73.4^\circ k)$$