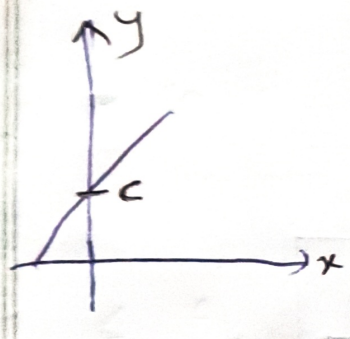
Dot product:→

$$a = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} \qquad b = \begin{bmatrix} y_1 \\ y_2 \\ y_3 \end{bmatrix}$$

$$\Rightarrow \vec{a}\cdot\vec{b} = x_1y_1 + x_2y_2 + x_3y_3 = \sum_{i=1}^{n} x_i y_i$$

$$= a^T \cdot b$$

$$= \|a\|\|b\| \cos\theta$$



$y = mx + c$

↪ 2D plane $ax + by + c = 0$

3D plane

$$ax + by + cz + d = 0$$

4 D plane (or) hyperplane

$$ax + by + cz + dz_1 + e = 0$$

Another terms ($x, y, z, z_1 \Rightarrow$ axis)

$$w_1x_1 + w_2x_2 + w_3x_3 + w_4x_4 + w_0 = 0$$

$$\Rightarrow \sum_{i=1}^{n} w_i x_i + w_0 = 0$$

$$\Rightarrow \boxed{\vec{w}\,\vec{x} + w_0 = 0} \Rightarrow \boxed{w^T x + w_0 = 0}$$

So, Equation of plane/line is represented as Vectors

$$\boxed{\pi_i : w^T x + w_0}$$

$$\vec{w}\vec{x} = \|w\|\|x\| \cos\theta$$

$$\vec{w}\cdot\vec{x} = \sum_{i=1}^{n} w_i x_i$$