* Line → $y = mx + c$

↓ m is slope

→ constant.

$y = \beta_0 + \beta_1 x_1$

$ax + by + c = 0$

$by = -ax - c$

$y = \boxed{-\frac{a}{b}} x \boxed{-\frac{c}{b}}$

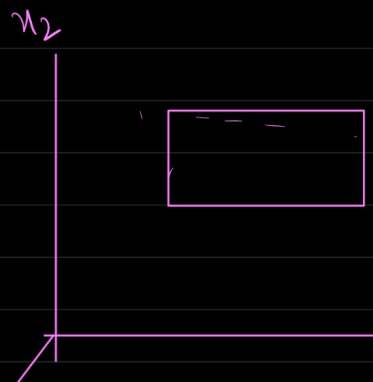
$m \quad c$

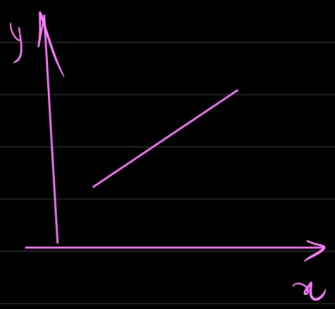
$\boxed{y = mx + c}$

$w_1 x_1 + w_2 x_2 + b = 0$

w_1, w_2 ⇓ Coefficients | weights.

⇓ eqn of line in 2d



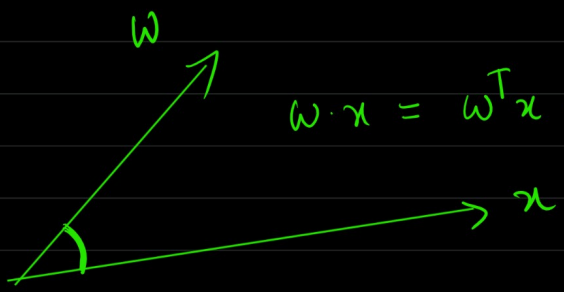


for n dimensions → $w_1 x_1 + w_2 x_2 + w_3 x_3 + \ldots w_n x_n + b = 0$

$$w = \begin{bmatrix} w_1 \\ w_2 \\ w_3 \\ \vdots \\ w_n \end{bmatrix} \quad x = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ \vdots \\ x_n \end{bmatrix}$$

$$w^T \cdot X = 0 \Rightarrow \begin{bmatrix} w_1, w_2, w_3 \ldots w_n \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_n \end{bmatrix} = w_1 x_1 + w_2 x_2 + \ldots w_n x_n = 0$$

$w^T x + b = 0$



$w \cdot x = w^T x = \|w\| \|x\| \cos\theta$

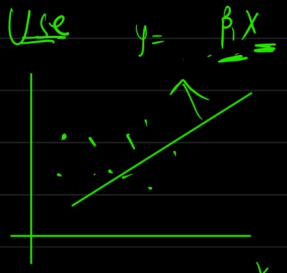
If $\theta = 90$

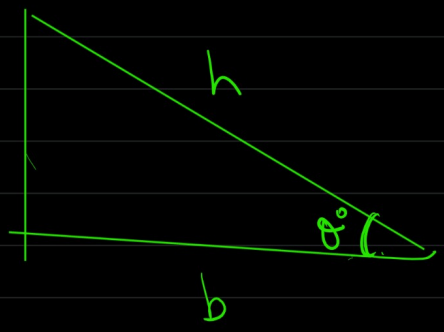
$\cos 90^\circ = 0$

$w \perp$

$\cos 0 = 1$

$\cos 90 = 0$





$\sin\theta = \frac{p}{h}$

$\cos\theta = \frac{b}{h}$

$\tan\theta = \frac{p}{b}$

Scalar / Vector

Which has only magnitude

28 metres.

45 km/hr

magnitude & direction.

Velocity

Car covered 20 metres in East.