

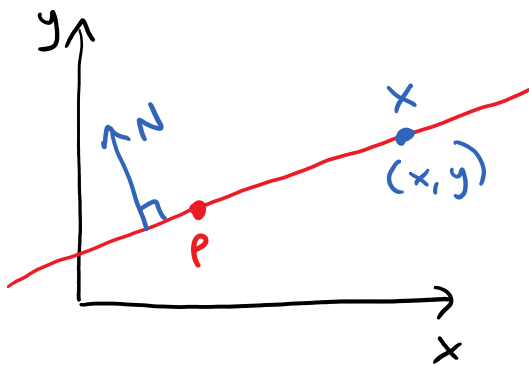
Section 1.3: Lines and Planes

Thursday, September 13, 2018 1:36 PM

\mathbb{R}^2 : we'll look at lines

\mathbb{R}^3 : we'll look at lines and planes

\mathbb{R}^2 : consider a line in \mathbb{R}^2



point P is a given point on the line with coords (x_0, y_0)

point X is an arbitrary point (x, y) on the line

$\vec{N} = \begin{bmatrix} a \\ b \end{bmatrix}$ is a vector \perp to the line

$$\vec{PX} \perp \vec{N}$$

$$\vec{PX} \cdot \vec{N} = 0$$

so $\begin{bmatrix} x-x_0 \\ y-y_0 \end{bmatrix} \cdot \begin{bmatrix} a \\ b \end{bmatrix} = 0$ \leftarrow the normal form of a line

if you multiply it out, then you get

$$a(x-x_0) + b(y-y_0) = 0 \quad \leftarrow \text{general equation of the line}$$