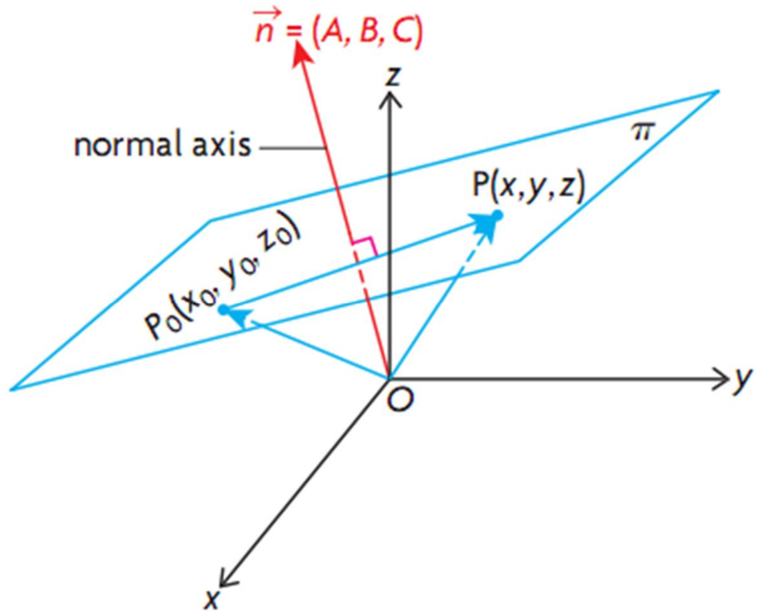
8.5 The Cartesian Equation of a Plane

In $\mathbb{R}^2$ we saw that the Cartesian Equation of a **Line** is given by: $Ax + By + C = 0$, where the vector $\vec{n} = (A, B)$ was a **normal** to the line (recall that **normal** means

In $\mathbb{R}^3$ a line has no normal (or infinitely many normals, depending on your perspective) which gives another reason that there is no "scalar" equation of a line in $\mathbb{R}^3$. However, we can obtain a normal to a plane in $\mathbb{R}^3$!

Consider the diagram:



Example 8.5.1

Determine the Cartesian equation of the plane containing the point $P_0(3,-1,2)$ and with normal vector $\vec{n} = (2,-1,5)$.

Two Methods

Example 8.5.2

Determine Vector, Parametric and Cartesian equations of the plane through the three (coplanar) points $P_1(3,-1,2)$, $P_2(0,2,-1)$ and $P_3(-1,2,3)$

Vector:

Parametric:

Cartesian:

Example 8.5.3

Given the Cartesian equation of the plane $\pi:\ 2x+y-3z+2=0$, find a vector equation for π.

Class/Homework for Section 8.5

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