

L4 – Equations of Planes in Scalar Form

Unit 6

MCV4U

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The scalar equation of a plane in three-space is $Ax + By + Cz + D = 0$, where $\vec{n} = [A, B, C]$ is a normal vector to the plane.

Example 1a: Determine the scalar equation of a plane that has normal vector $\vec{n} = [3, -2, 5]$ and contains the point $P_0(1, 2, -3)$.

Method 1: Dot Product**Method 2: Use $Ax + By + Cz + D = 0$**

Example 1b: Is vector $\vec{a} = [4, 1, -2]$ parallel to the plane?

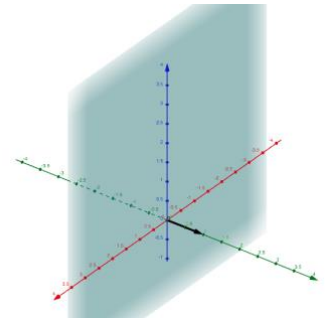
Example 1c: Is vector $\vec{b} = [15, -10, 25]$ normal to the plane?

Example 2: Find the scalar equation of the plane containing the points $A(-3, -1, -2)$, $B(4, 6, 2)$, and $C(5, -4, 1)$.

<https://www.geogebra.org/3d/u3n69tvc>

Example 3: Determine the scalar equation of each plane

a) parallel to the xz -plane; through the point $(-7,8,9)$



[Geogebra 3D visualization](#)

b) containing the line $[x, y, z] = [1, 2, 4] + t[4, 1, 11]$ and perpendicular to $[x, y, z] = [4, 15, 8] + s[2, 3, -1]$.