6.4 Equations of Planes in Scalar Form Lesson

This document was composed and formatted by Annie Bernatchez.

The course material originated from www.jensenmath.ca

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.

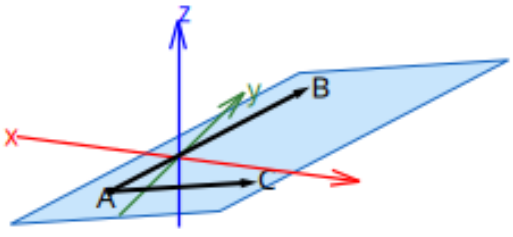
Example 1a: Determine the scalar equation of a plane that has normal vector $\vec{n} = [3, -2, 5]$ and contains the point $P_0(1, 2, -3)$.

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 $C(5, -4, 1)$.

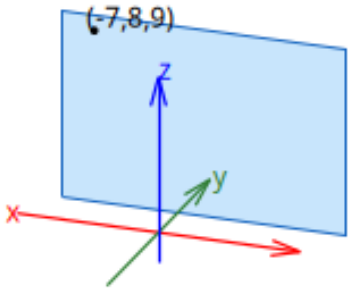


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www.geogebra.org/3d/u3n69tvc (bonus interactive visualization)

Example 3: Determine the scalar equation of each plane

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



Geogebra 3D visualization (bonus interactive visualization)

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

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