Scalar equation of a plane

To find the scalar equation of a plane, we'll use the formula

$$a(x - x_0) + b(y - y_0) + c(z - z_0) = 0$$

where $P_0(x_0, y_0, z_0)$ is a given point and $v = \langle a, b, c \rangle$ is the normal vector to the plane. The vector may also be in the format $v = ai + bj + ck$.

Example

Find the scalar equation of the plane.

$$P(1,4,-8)$$

$$\langle 3,6,2 \rangle$$

Plugging the given point and the given vector into our formula, we get

$$3(x - 1) + 6(y - 4) + 2\left[z - (-8)\right] = 0$$

$$3(x - 1) + 6(y - 4) + 2(z + 8) = 0$$

$$3x - 3 + 6y - 24 + 2z + 16 = 0$$

$$3x + 6y + 2z = 11$$

The scalar equation of the plane is given by $3x + 6y + 2z = 11$.