Math215

Homework 4, Problem 3

November 24, 2021

10.5 Pr31

Find and equation of the plane that passes through the point (1,5,1) and is perpendicular to the planes 2x + y - 2z = 2 and x + 3z = 4

Finding vector normal to the plane

$$< a_1, a_2, a_3 > \times < b_1, b_2, b_3 > = < a_y b_z - a_z b_y, a_z b_x - a_x b_z, a_x b_y - a_y b_x > \quad (1)$$

$< 2, 1, -2 > \times < 1, 0, 3 > = < (1)(3) - (-2)(0), (-2)(1) - (2)(3), (2)(0) - (1)(1) > = < 3, -8, -1 >$

Finding normal vector through the point

$$a(x - x_0) + b(y - y_0) + c(z - z_0) = 0 \quad (2)$$

$$3(x - 1) - 8(y - 5) - (z - 1) = 0$$

$$3x - 3 - 8y + 40 - z + 1 = 0$$

$$3x - 8y - z = -38$$