Name: SOLUTIONS

Student ID: _____

Quiz 10

Question 1. *(4 marks)* Find the equation of the plane passing through the point $P(1,1,4)$ and with normal vector $\vec{n} = (1,9,8)$.

$$x + 9y + 8z + d = 0$$

$$(1) + 9(1) + 8(4) + d = 0$$

$$42 + d = 0$$

$$d = -42$$

$$\therefore \boxed{x + 9y + 8z - 42 = 0}$$

Question 2. *(2 marks)* Find the equation of the line through the point $P(-2,3,-2)$ and parallel to the vector $\vec{v} = (6,-6,-2)$.

$$(x, y, z) = (-2 + 6t, \ 3 - 6t, \ -2 - 2t) \quad t \in \mathbb{R}$$

Question 3. *(4 marks)* Determine whether the planes $x - 2y + 3z - 4 = 0$ and $-2x + 5y + 4z + 1 = 0$ are perpendicular.

$$\vec{n_1} = (1, -2, 3) \qquad \vec{n_2} = (-2, 5, 4)$$

$$\vec{n_1} \cdot \vec{n_2} = -2 - 10 + 12 = 0$$

YES, THE PLANES ARE PERPENDICULAR.