9F Part 2 Perpendicular Distances with Lines & Planes

The perpendicular distance of (α, β, γ) from $n_1x + n_2y + n_3z + d = 0$ is $\dfrac{|n_1\alpha + n_2\beta + n_3\gamma + d|}{\sqrt{n_1^2 + n_2^2 + n_3^2}}$.

1. Find the perpendicular distance from the point with coordinates $(3,2,-1)$ to the plane with equation $2x - 3y + z = 5$

2. The plane Π has equation:

$$\boldsymbol{r}.(\boldsymbol{i} + 2\boldsymbol{j} + 2\boldsymbol{k}) = 5$$

The point P has coordinates:

$$(1,3,-2)$$

a) Find the shortest distance between P and Π

b) The point Q is a reflection of P in Π. Find the coordinates of Q.

3. The line l_1 has equation:

$$\frac{x-2}{2} = \frac{y-4}{-2} = \frac{z+6}{1}$$

The plane Π has equation:

$$2x - 3y + z = 8$$

The line l_2 is a reflection of l_1 in the plane Π. Find a vector equation of the line l_2.