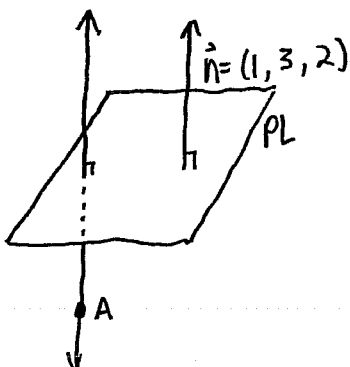


Quiz 10

This quiz is graded out of 10 marks. No books, calculators, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

Question 1. YP pg.1 #5a (3 marks) Given the point $A(1, 2, -5)$ and the plane PL: $x + 3y + 2z - 11 = 0$. Find the parametric equations of the line passing through the point A and perpendicular to the plane PL.

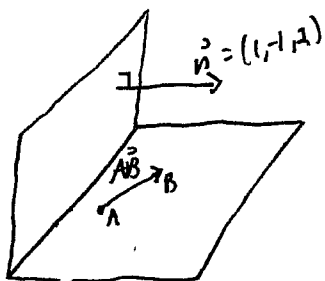


$$l: (x, y, z) = A + t\vec{n} \quad t \in \mathbb{R}$$

$$= (1, 2, -5) + t(1, 3, 2)$$

$$l: \begin{cases} x = 1+t \\ y = 2+3t \\ z = -5+2t \end{cases}$$

Question 2. YP pg.2 #17 (4 marks) Find an equation for the plane which is perpendicular to the plane $x - y + 2z = 3$ and passes through the points $A(1, 0, 2)$ and $B(0, 1, -1)$.



$$\vec{n}_2 = \vec{n} \times \vec{AB} \quad \vec{AB} = \vec{B} - \vec{A} = (0, 1, -1) - (1, 0, 2) = (-1, 1, -3)$$

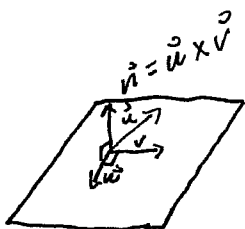
$$\begin{pmatrix} 1 & -1 \\ -1 & 1 \\ 2 & -3 \end{pmatrix}$$

$$= \left(\begin{vmatrix} -1 & 1 \\ 2 & -3 \end{vmatrix}, -\begin{vmatrix} 1 & -1 \\ 2 & -3 \end{vmatrix}, \begin{vmatrix} 1 & -1 \\ -1 & 1 \end{vmatrix} \right) = (1, 1, 0)$$

$$\text{So } \begin{cases} x + y + d = 0 \\ 1 + 0 + d = 0 \\ d = -1 \end{cases}$$

$$\therefore x + y - 1 = 0$$

Question 3. YP pg.4 #11 (3 marks) Find a vector in the plane determined by $\vec{u} = (1, 2, 0)$ and $\vec{v} = (0, 1, 2)$ such that it is orthogonal to \vec{v} .



$$\vec{n} = \vec{u} \times \vec{v} = \begin{pmatrix} |2 & 1| & -|1 & 0| & |1 & 0| \\ 0 & 2 & 2 & 1 & 2 \end{pmatrix} = (4, -2, 1)$$

$$\vec{w} = \vec{n} \times \vec{v} = \begin{pmatrix} |-2 & 1| & -|4 & 0| & |4 & 0| \\ 4 & 0 & 2 & 1 & 2 \end{pmatrix} = (-5, -8, 4)$$