MA1034 Theoretical Calculus IV Name Solutions

Quiz 1 B Term, 2017

High: 25
Median: 25
Low: 19

Show all work needed to reach your answers.

1. (5 points) Please give an equation of the plane containing the point $(1, -2, 4)$ perpendicular to the normal vector $\mathbf{N} = \langle \mathbf{5}, \mathbf{-1}, \pi \rangle$.

$5(x-1) - 1(y+2) + \pi(z-4) = 0 \iff 5x - y + \pi z = 7 + 4\pi$ (+2, +2, +1)

2. (12 points) If $\mathbf{a} = \langle \mathbf{1}, \mathbf{3}, \mathbf{-2} \rangle$ and $\mathbf{b} = \langle \mathbf{4}, \mathbf{-1}, \mathbf{-1} \rangle$, please compute $\mathbf{a} \cdot \mathbf{b}$ and $\mathbf{a} \times \mathbf{b}$.

#1 P.8 Class Notes

$\vec{a} \cdot \vec{b} = 1 \cdot 4 - 3 \cdot 1 + 2 \cdot 1 = 3$ (+4) || Dot Product is a scalar.

$\vec{a} \times \vec{b} = \begin{vmatrix} \hat{\imath} & \hat{\jmath} & \hat{k} \\ 1 & 3 & -2 \\ 4 & -1 & -1 \end{vmatrix} = \langle -3 \cdot 1 - 2 \cdot 1, -(-1 + 8), -1 - 12 \rangle$ (+2, +2, +2, +1, +1)

$= \langle -5, -7, -13 \rangle$

$\mathbf{a} \cdot \mathbf{b} =$ 3

$\mathbf{a} \times \mathbf{b} =$ $\langle -5, -7, -13 \rangle$

3. (8 points) Please give a parameterization of the circle of radius 7 centred at the origin, starting when $t = 0$ from the point $(-7, 0)$ and moving counterclockwise.

$\begin{cases} X_1(t) = -7\cos(t) \\ X_2(t) = -7\sin(t) \end{cases}$ or $\begin{cases} X(t) = 7\cos(t + \pi) \\ Y(t) = 7\sin(t + \pi) \end{cases}$ (+1, +2, +1, +1, +2, +1)

or something else equivalent.