

MA203 - Linear Algebra - Class test 1

Attempt **ALL** questions - Total of 40 marks

1. Find the parametric equation of the line in \mathbb{R}^3 in the direction $v = (1, 0, -2)$ and containing the point $P = (2, 1, 4)$. Find the angle between the vectors P and v . (10)

2. (a) Find the equation of the plane Π in \mathbb{R}^3 with normal (vector) $n = (3, -2, 1)$ and containing the point $P = (1, 2, 1)$. (5)

(b) Find the distance from the point $Q = (2, 3, 6)$ to the plane Π in part (a). (5)

3. Determine if the following system of linear equations is consistent, and if so find the solution(s):

(i) $x + y + z + w = 5$

(ii) $2x + y - z + 3w = 14$

(iii) $3x - 4y + 2z + w = -4$

(iv) $2x + 2y + 3z - 2w = -3$. (10)

4. Find all of the solutions to the following system of linear equations.

(i) $x_1 + 2x_2 + 2x_3 + 7x_4 = 1$

(ii) $x_1 + 2x_2 + 3x_3 + 10x_4 = 2$

(iii) $-x_1 - 2x_2 - 2x_3 - 6x_4 = 1$. (10)