

Books, watches, notes or cell phones are **not** allowed. The **only** calculators allowed are the Sharp EL-531***. You **must** show all your work, the correct answer is worth 1 mark the remaining marks are given for the work.

Question 1. (1 mark each) Complete each of the following sentences with MUST, MIGHT, or CANNOT.

a. If $\text{proj}_{\mathbf{a}}(\mathbf{v}) = \text{proj}_{\mathbf{a}}(\mathbf{u})$ then \mathbf{v} _____ be equal to \mathbf{u} .

Question 2. (5 marks) Find the equation of a plane which is parallel to the plane $2x + y - 2z = 3$ and the distance between the two planes is 2.

Question 3. (4 marks) Let \mathbf{u}, \mathbf{v} be unit vectors in \mathbb{R}^n and assume that they are all orthogonal to each other. Simplify completely: $\text{Proj}_{\mathbf{u}+\mathbf{v}}(\mathbf{u} - 2\mathbf{v})$.