Hand your completed quiz in before the due date. Do not forget to write down your name and student ID number. Marks will be awarded for this quiz based on the clarity of your answers. The marker will pay close attention to the logic of your answers. Please show all your working.

Q1. Let $u = (3, 2, -1), v = (0, 2, -3)$. Compute

(a) $u \times v$. (b) $v \times u$.

Q2. Find a vector that is orthogonal to both $u$ and $v$.

(a) $u = (-6, 4, 2), v = (3, 1, 5)$. (b) $v = (-2, 1, 5), u = (3, 0, -3)$.

Q3. Find the equation of the plane passing through $P$ and having $n$ as a normal.

(a) $P = (-1, 3, 2), n = (-2, 1, -1)$. (b) $P = (1, 1, 4), n = (1, 9, 8)$.

Q4. Find the equation of the plane passing through the given points.

(a) $P = (-4, -1, -1), Q = (-2, 0, 1), R = (-1, -2, -3)$. (b) $P = (5, 4, 3), Q = (4, 3, 1), R = (1, 5, 4)$.

Q5. Determine whether the planes are parallel.

(a) $4x - y + 2z = 5$ and $7x - 3y + 4z = 8$. (b) $x - 4y - 3z - 2 = 0$ and $3x - 12y - 9z - 7 = 0$.

Q6. Determine whether the planes are parallel.

(a) $x = -5 - 4t, y = 1 - t, z = 3 + 2t; x + 2y + 3z - 9 = 0$. (b) $x = 3t, y = 1 + 2t, z = 2 - t; 4x - y + 2z = 1$.

Q7. Determine whether the planes are perpendicular.

(a) $x = -2 - 4t, y = 3 - 2t, z = 1 + 2t; 2x + y - z = 5$. (b) $x = 2 + t, y = 1 - t, z = 5 + 3t; 6x + 6y - 7 = 0$.

Q8. Find parametric equations for the line passing through $P$ and parallel to $n$.

(a) $P = (3, -1, 2), n = (2, 1, 3)$. (b) $P = (0, 0, 0), n = (1, -2, 3)$.

Q9. Find parametric equations for the line passing through the given points.

(a) $(5, -2, 4), (7, 2, -4)$. (b) $(0, 0, 0), (2, -1, -3)$. 