United International University
School of Science and Engineering
Mid Term Exam Trimester: Fall 2022
Course Title: Coordinate Geometry and Vector Analysis
Course Code: Math 2201 Marks: 30
Total Time: 1 hour and 45 minutes

Answer all questions.

1. a) Identify the type of Conic. **[5]**

$$2\sqrt{2}x^2 + 5\sqrt{2}xy + 2\sqrt{2}y^2 + 18x + 18y + 36\sqrt{2} = 0$$

Or

Sketch the graph of the Conic

$$4x^2 + 2y^2 + 18x - 2y - 50 = 0\,.$$

b) Find an equation for the conic that has its vertex at $(4, 3)$ and its focus at $(4, 7)$. **[3]**

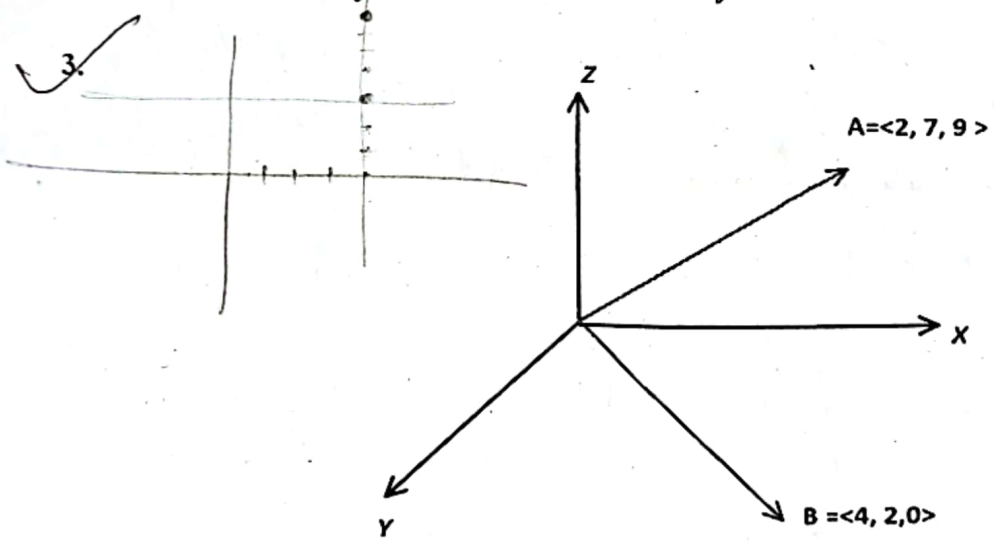
2. a) Determine whether or not the given lines are skew **[5]**

$$L_1: \quad x = 2 - t, \quad y = -1 + 2t, \quad z = -1 - 5t$$
$$L_2: \quad x = -t, \quad y = 5 - 5t, \quad z = 3 + 2t$$

b) Find the equation of line of intersection of the planes

$$x + y + z - 5 = 0 \text{ and } \quad 5x - 2y + 4z = 7. \quad \textbf{[3]}$$

3. **[6]**



a) Find the orthogonal projection of B along A.
b) Find the angle between vector A and y-axis.
c) Find a unit vector that is orthogonal to vector A and x-axis.

4. a) Find the area of the triangle with vertices $P_1(-1, 4, 0)$, $P_2(-2, 0, -1)$ and $P_3(1, -2, 0)$. **[3]**

b) Find the equation of the plane passing through the points $p_1(1, 0, 3)$, $p_2(0, 1, -2)$ and $p_3(-2, 1, 0)$. **[3]**

c) Find the distance between two planes $2x + 3y - z = 2$ and $4x + 6y - 2z = 5$ **[2]**