



United International University  
School of Science and Engineering  
Mid Term Examination Trimester: Summer-2022  
Course Title: Coordinate Geometry and Vector Analysis  
Course Code: Math 2201 / Math 201 Marks: 30 Time: 1 Hour & 45 Mins

Answer all questions. Answer all parts of a question together.

1. (a) Identify & sketch the curve  $x^2 + 2\sqrt{3}xy + 3y^2 + 2\sqrt{3}x - 2y = 0$ . [6]
- (b) Find an equation for the hyperbola that has foci  $(-2, -3)$  and  $(-2, 5)$  and distance between vertices 6. [4]
2. (a) Suppose that two forces  $F_1$  and  $F_2$  are applied at the same point on an object. If the magnitude of  $F_1$  and  $F_2$  are 263 lb and 327 lb respectively and  $F_2$  makes an angle  $60^\circ$  with the positive  $x$ -axis and  $F_1$  makes an angle  $45^\circ$  with  $F_2$ , then find the magnitude of the resultant force of them and the angle that it makes with the positive  $x$ -axis. [4]
- (b) A force of  $F = -2i + 5j + 3k$  newtons is applied to a point that moves a distance of 27 meters in the direction of the vector  $i - 2j - 5k$ . How much work is done? [2]
- (c) Find the angle and distance between the planes  $2x - 3y + 5z + 3 = 0$  and  $-4x + 6y - 10z = 5$ . [4]
3. (a) Find an equation of plane that passes through the points  $(3, -2, -1)$ ,  $(-1, -2, 3)$  and is perpendicular to the plane  $2x - 5y + 3z = 9$ . [4]
- (b) Determine whether the following lines are skew or not. [3]
- $$\begin{aligned} L_1: x &= 3 + 8t, & y &= 5 - 3t, & z &= 6 + t \\ L_2: x &= 2 + 8t, & y &= 6 - 8t, & z &= 10t \end{aligned}$$
- (c) Find the volume of the parallelepiped that has  $\langle 1, -3, -2 \rangle$ ,  $\langle -2, 3, -4 \rangle$  and  $\langle -3, 1, 4 \rangle$  as adjacent edges. [3]