

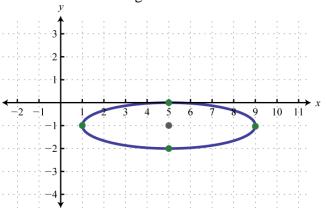
United International University School of Science and Engineering

Mid Term Exam Trimester: Fall 2020 Course Title: Coordinate Geometry and Vector Analysis

Course Code: Math 201/Math 2201 Marks: 20 Time: 1 Hour.

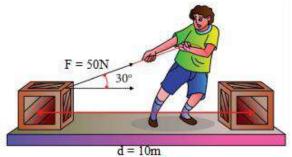
There are 3 questions, answer any 2 of them.

Q1. a) Find the equation and foci of the conic given below.



[3]

- b) Are the line x = 1 t, y = 2 + 3t, z = t and the plane 3x 2y + z = 1 parallel and [4] intersecting? Find the angle that makes the given plane with the yz -plane.
- Find the parametric equation for the tangent line to the curve of intersection of the surfaces $x^2 + y^2 = 10$ and $x^2 + z^2 = 10$ at the point (-1, 3, -3).
- Q2. a) Find an equation of the plane that contains the point (2, -5, -3) and the line x = 3 2t, y = 3t, z = -2 t.
 - b) (i) According to following figure, find the work-done. [4]



- (ii) Are the vectors $v_1=-\hat{\imath}+2\hat{\jmath}+5\hat{k}$, $v_2=3\hat{\imath}-\hat{\jmath}+2\hat{k}$ & $v_3=2\hat{\imath}+\hat{\jmath}-\hat{k}$ lie in the same plane?
- c) Find the equation of the tangent plane and parametric equation of the normal line to [3] the surface $\mathbf{z} = \frac{5}{\sqrt{x^2 + y^2}}$ at the point P(3, 4, 1).

- Q3. a) Sketch the graph of the conic $9x^2 4y^2 + 18x + 8y + 41 = 0$. [3]
 - b) Find a vector having magnitude $\sqrt{7}$ and in the opposite direction of the vector $\mathbf{v} = [4]$ $2\hat{\imath} + 3\hat{\jmath} + \hat{k}$. Also, find the direction angles of the vector \mathbf{v} .
 - Find the directional derivative of $f(x, y, z) = \frac{x}{y} + \frac{y}{z} + \frac{z}{x}$ at the point (2, 1, 3) in the direction of the vector $\mathbf{v} = \langle -3, 7, 2 \rangle$.