

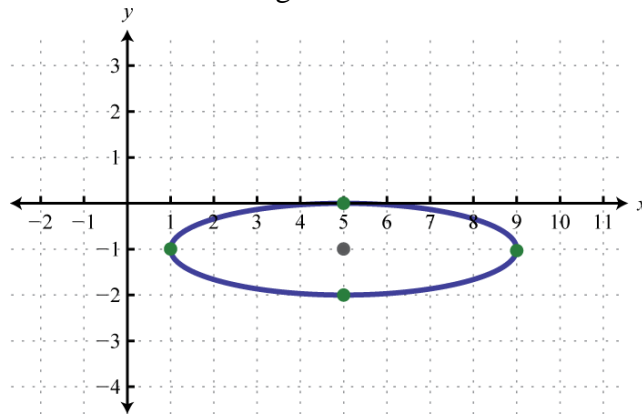


United International University
School of Science and Engineering
 Mid Term Exam Trimester: Fall 2020

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.

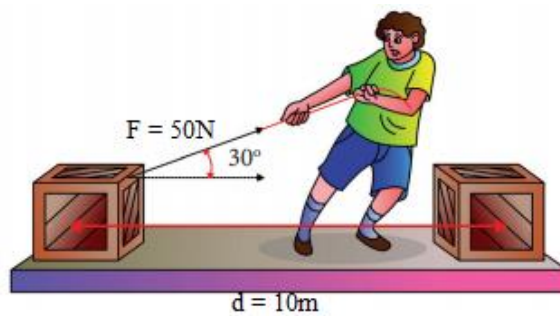
- Q1. a)** Find the equation and foci of the conic given below. [3]



- b) Are the line $x = 1 - t, y = 2 + 3t, z = t$ and the plane $3x - 2y + z = 1$ parallel and intersecting? Find the angle that makes the given plane with the yz -plane. [4]
- c) 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 $(-1, 3, -3)$. [3]

- Q2. a)** Find an equation of the plane that contains the point $(2, -5, -3)$ and the line $x = 3 - 2t, y = 3t, z = -2 - t$. [3]

- b) (i) According to following figure, find the work-done. [4]



- (ii) Are the vectors $\mathbf{v}_1 = -\hat{i} + 2\hat{j} + 5\hat{k}, \mathbf{v}_2 = 3\hat{i} - \hat{j} + 2\hat{k}$ & $\mathbf{v}_3 = 2\hat{i} + \hat{j} - \hat{k}$ lie in the same plane?
- c) Find the equation of the tangent plane and parametric equation of the normal line to the surface $z = \frac{5}{\sqrt{x^2 + y^2}}$ at the point $P(3, 4, 1)$. [3]

- 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 $\mathbf{v} = 2\hat{\mathbf{i}} + 3\hat{\mathbf{j}} + \hat{\mathbf{k}}$. Also, find the direction angles of the vector \mathbf{v} . [4]
- c) 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 $\mathbf{v} = \langle -3, 7, 2 \rangle$. [3]