MAT120: Integral Calculus and Differential Equations
BRAC University

BRAC UNIVERSITY
Inspiring Excellence

SET: Q

Assignment 4

Please write your name and ID on the assignment script. The deadline for submitting the assignment is ***9th September 2020****. Solve* ***all the problems****. You will receive* 5 *bonus marks for* ***submitting your assignment in LaTeX****.* ***No Late submissions will be accepted****.*

Any information you need to solve this exam are given in the question.

Watch the videos in this Playlist if you are confused about the assignment process: ***All About Assignments Playlist, Click Here***

Be creative, use your intuition. Answer the questions by yourself. Cheating and Copying will lead to ***50%*** *deduction from your total marks in the course and a Zero in the assignment.* ***Total marks is 60****. Each question carries 10 marks.*

---

1. Evaluate the integral

$$\int_1^2 \int_z^2 \int_0^{\sqrt{3}y} \frac{y}{x^2+y^2}\, dx\, dy\, dz$$

2. Solve

$$(x+1)\,\frac{dy}{dx} + y = ln\ x,\ y(1) = 10$$

3. Evaluate

$$\int_1^4 \int_0^{\sqrt{x}} \frac{3}{2} e^{\frac{y}{\sqrt{x}}} dydx$$

4. Solve the differential equation using variables separable method : $x^2\frac{dy}{dx} = y - xy; y(-1) = -1.$

5. Evaluate the integral:

$$\int_0^{\frac{\pi}{4}} \int_0^1 \int_0^{x^2} x\cos y dz dx dy$$

6. Solve the system for x and y in terms of u and v then find the Jacobian $\frac{\partial(x,y)}{\partial(u,v)}$.
$u = x - y;\ v = 2x + y$