BRAC UNIVERSITY

Inspiring Excellence

Department of Mathematics and Natural Sciences

MAT 110

Open Book Assignment

SUMMER 2021

Please write your name and ID on the first page of the assignment answer
script - you have to do this for both handwritten or LaTeX submission.
The last date of submission is 23/8/2021, 1159 pm. Solve all problems.

You can only submit a PDF file - image or doc files won't be accepted. Before submitting the PDF, please rename the PDF file in the format -SET_ID_SECTION.

If you use LaTeX, you must add a screenshot of the raw code and compiled pdf side by side, in order to earn your bonus.

This set was prepared by AQD. If you have any questions, please text AQD on Slack.

---

1. Determine the 1st and 2nd degree Taylor polynomials L(x,y) and Q(x,y) for $f(x, y) = x^2 y + y^2$ for (x,y) near the point (1,3).

2. Determine the 1st and 2nd degree Taylor polynomials L(x,y) and Q(x,y) for $f(x, y) = \ln{(x^2 + y^2 + 1)}$ for (x,y) near the point (0,0).

3. Locate all relative maxima, relative minima and saddle points (if any) for
$$f(x, y) = x^2 + y^2 + \frac{2}{xy}$$

4. Locate all relative maxima, relative minima and saddle points (if any) for
$$f(x, y) = xy + \frac{2}{x} + \frac{4}{y} \ .$$

5. Compute the Divergence and Curl of the following vector $\vec{F}$
$$\vec{F} = yze^{xy}\vec{i} + xze^{xy}\vec{j} + (e^{xy} + 3\cos 3z)\vec{k}$$

6. Compute the Divergence and Curl of the following vector
$$\vec{F} = (xyz)\ \vec{i} + y\sin z\vec{j} + (y\cos x)\vec{k}$$

z