



Department of Mathematics and Natural Sciences

MAT 110

ASSIGNMENT 4

SUMMER 2021

SET: 24 (AQD)

Please write your name and ID on the first page of the assignment answer script - you have to do this for both handwritten or L^AT_EX submission. The last date of submission is 25/8/2021, 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.

*Answer the questions by yourself. Plagiarism will lead to an F grade in the course. **Total marks is 300. Each question is worth 50 marks.** If you do your work using L^AT_EX you will get a mark which will be added as a L^AT_EXbonus to your course grade.*

If you use L^AT_EX, 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 $f(x,y) = x^2y + y^2$ 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
$$\vec{F} = (xyz)\vec{i} + y\sin z\vec{j} + (y\cos x)\vec{k}$$