BRAC UNIVERSITY

Inspiring Excellence

Department of Mathematics and Natural Sciences

MAT 110

Open book Assignment

SUMMER 2021

SET: 10(AQD)

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.

Total marks is 350.*It will be converted to 20. If you have issues with the questions, please contact AQD on Slack.*

1. Find the relative extrema (if any) of the function $f(x) = \ln(2 + x^2)$.
2. Find the Taylor Series for $f(x) = \ln x$ about $x = e$
3. Find $\dfrac{\partial Z}{\partial r}$ and $\dfrac{\partial Z}{\partial \theta}$ of function $Z = \ln(x^2 + 1)$; $x = r\cos\theta$
4. Determine the critical points and locate any relative minima, maxima and saddle points (if any) of function f defined by $f(x, y) = x^2 + y^2 + \dfrac{2}{xy}$.
5. Calculate the second-degree Taylor polynomial of $f(x, y) = x^2y + y^2$ at the point (1,3)
6. Compute the Divergence and Curl of the following vector $\vec{F}$:$\vec{F} = \sin(\cos(xy))\vec{i} + e^{xz}\vec{j} + 2^z\vec{k}$
7. Write the equation into the standard form of the equation of the hyperbola: $-x^2 + 2y^2 + 2x + 8y + 3 = 0$. Locate the centre, vertices and foci of the hyperbola.