BRAC
UNIVERSITY

Inspiring Excellence

Department of Mathematics and Natural Sciences

MAT 110

MID ASSIGNMENT

SUMMER 2021

SET: 02(SKN)

Please write your name and ID on the first page of the assignment answer script. The deadline is 30th july, 9.00 am to 10.30 am. 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 250.**It will be converted to 20. If you have issues with the questions, please contact SKN on Slack.*

1. Evaluate $f(-10)$, $f(1)$, $f(10)$ for the following picewise function $f(t)$. Find domain ,range and sketch the graph of the given function:

$$f(t) = \begin{cases} \sqrt{t-4}, & t \geq 4 \\ 8 - 2t, & t < 4. \end{cases}$$

2. The displacement of a particle moving back and forth along a straight line is given by the following equation:

$S(t) = 2\sin(\pi t) + 3\cos(\pi t)$

where t is measured in second. Estimate the instantaneous velocity of the particle at $t = 2$.

3. Evaluate the following limit:

$\lim_{t \to 1} \sin^{-1}(\dfrac{1 - \sqrt{t}}{1 - t}).$

4. Find Taylor series of $f(x) = \sin x$ centered at $x = 0$ and $x = \dfrac{\pi}{3}$.

5. A curve has parametric equations $x = 2 \sin t$, $y = \cos(2t) + 2 \sin t$ for $\dfrac{-\pi}{2} \leq t \leq \dfrac{-\pi}{2}$. Find out $\dfrac{dy}{dx}$ and hence find coordinate of the stationary point(s),if exist.