



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. The deadline is 30th july, 9.00 am to 10.10 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.*

1. Evaluate  $f(-10)$ ,  $f(1)$ ,  $f(10)$  for the following piecewise 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. Find Taylor series of  $f(x) = \sin x$  centered at  $x = 0$  and  $x = \frac{\pi}{3}$ .
4. Determine whether  $f(x) = |x + 1|$  is continuous at  $x = -1$ .
5. Find the differentiation  $\left(\frac{dy}{dx}\right)$  using definition with limit of the following:  
$$y = \frac{-2x}{5x - 2}.$$
6. Find  $\frac{dy}{dx}$  of the function  $y(x) = \frac{\tan^{-1}(2x)}{2+x^2}$ .