ENGR121 Assignment 5
DUE: 11:59pm Wednesday 8 May 2024

Submission is online via the Submission link in the web left bar. Ensure your submission is a single pdf file, with a name that ends with the characters *yourUserName.pdf* . View your submission after uploading it.

1. Working required to achieve full marks. Find the following limits.

   (a) Consider function

   $$f(x) = \begin{cases} x^3, \text{ if } x < 1 \\ x^2, \text{ if } x \geq 1 \end{cases}$$

   Find $\lim_{x \to -1} f(x)$ and $\lim_{x \to 1} f(x)$.

   (b) $\lim_{t \to 2} \dfrac{t^2 - 4t + 4}{t - 2}$.

   (c) $\lim_{t \to 0} \dfrac{t^2 - 4t + 4}{t - 2}$.

2. Find the derivatives y' of the following functions, by using the definition of a derivative. You cannot use the table of common derivatives in this question. Working is required to achieve full marks.

   (a) $y(x) = 7x^2$ (b) $y(x) = 2x - 10$ (c) $y(x) = \dfrac{1}{x}$

3. The slope of the function $y(x)$ is 10. What can you say about the function $y(x)$? You need to explain your answer.

4. Consider function

   $$y(x) = \begin{cases} \cos(x), \text{ if } x \geq 0 \\ -2x + 1, x < 0 \end{cases} .$$

   Does it have any points where the derivative does not exist? You need to justify your opinion to archive full marks. Your justification of bad points (if any) cannot be based on the graph of this function. You can use the table of common derivatives in this question.