Math 104 section 108 Homework 2

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First Name: _____ Last Name: _____

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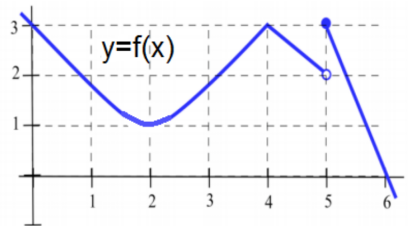
1 Short answer questions

Exercise 1.1. In reference to the graph provided, determine if the statements below are true (T) or false (F). Each part is worth 0.5 mark. (2 marks)



1. $f(x)$ is continuous on $[1, 5]$.
2. At $x = 4$, the function is continuous but does not have derivative.
3. Graph of $f'(x)$ has only one root between $[0, 6]$.
4. $f'(3) > 0$ and $f'(6) < 0$.

2 Long answer questions – you must show your work

Exercise 2.1. $(x) = (\sqrt{x-1})$. Using the limit definition for derivative, show that $f'(5) = 1/4$. No marks will be given to solutions that involve rules of differentiation (3 marks)

Exercise 2.2. Consider the piecewise function $f(x)$ defined below.

$$f(x) = \begin{cases} ax\cos(x) & x \leq 0 \\ \frac{x-1}{x+1} + be^x & x > 0 \end{cases}$$

1. Find b such that $f(x)$ is continuous everywhere. (2 marks)
2. Find a such that the function $f(x)$ is differentiable everywhere. (2 marks)
3. Find the equation of tangent line to the curve of $f(x)$ at $x = 0$ on the curve. (1mark)