

Show all work and circle/box your final answer. All answers must be simplified unless stated otherwise. If you finish early, you may leave with my approval.

1. (0 points) Is $f(x)$ continuous at $x = 1$ if $f(x) = \begin{cases} 8x - 3 & x \leq 1 \\ 4x^2 + 5 & x > 1 \end{cases}$

2. (0 points) Find the value of the constant k that makes the function continuous:

$$f(x) = \begin{cases} \frac{2x^2 - x - 15}{x - 3} & x \neq 3 \\ kx - 1 & x = 3 \end{cases}$$

3. (*0 points*) Show that there is at least one solution to $x^5 - 2x^3 - 2 = 0$

4. (*0 points*) Using the limit definition of a derivative, differentiate $f(x) = \frac{12}{x}$