

Computer Assignment

Use Wolfram Alpha or any other technology to answer the questions below. Copy all relevant answers into this Word document. Save the Word document and send it to me via email attachment. Do NOT forget to type your name into the document, and include in your responses the commands you used to get the answers.

1. Consider the function $f(x) = \frac{e^{2x}-1}{x}$ Find the limit of $f(x)$ as x approaches zero.
2. Define the function $f(x) = x(x-1)^5(x+1)^4$
 - a) Find the derivative of that function.
 - b) Find $f'(0.67)$ (the first derivative at 0.67). What does that mean for the function f at the point?
 - c) Find $f''(0.67)$ (the second derivative at 0.67). What does it mean for the function f at that point?
 - d) Find all points where the derivative is zero.
3. Define the function $f(x) = -2x^4 + 3x^3 + 8x^2 + 4$
 - a) Find the derivative of the function and use Wolfram Alpha to confirm your answer.
 - b) Find all points where the derivative is zero and classify them as local extrema, if possible
 - c) Determine if f is increasing (going up) or decreasing (going down) between the points found in (b)
4. Find the following integrals:
 - a) $\int \frac{4t+3}{(6t^2+9t+1)} dt$
 - b) $\int_0^1 \frac{y^2}{(4-3y)^4} dy$
5. Find the area between the graph of $f(x) = (x^2 - 4)(x^2 - 1)$ and the x axis. Note that one simple definite integral won't do it, you will need to carefully determine where the function is positive and negative and integrate accordingly, perhaps using multiple steps.
6. Solve the system of linear equations with the following augmented coefficient matrix:

$$\left(\begin{array}{ccccc|c} 1 & 2 & 3 & 4 & 1 & \\ 1 & 1 & 1 & 1 & 2 & \\ 0 & 1 & 0 & 1 & 3 & \\ 1 & 0 & -1 & 0 & 1 & \end{array} \right)$$