

Math 1303

Computer Assignment

Use Maple or Wolfram Alpha to solve the following problems. For each problem, write down exactly what you typed into the Maple or Wolfram Alpha to help obtain your solution, as well as the answer to the problem. In some cases you might not be able to type in a single command to get the answer. You may have to use several commands in sequence, or perhaps do some of the easy calculations by hand.

You must turn in this assignment **on the day of the final exam** at the latest.

1. Find the following limits:

a) $\lim_{x \rightarrow 0} \frac{e^x - 1}{x}$

b) $\lim_{x \rightarrow 1} \frac{(x-1)^3(x^2-2x+1)}{e^{x-1} - (x-1)^2 - 1}$

2. Differentiate

a) $f(x) = \frac{3x^2 - 5x}{x^2 - 1}$

b) $y = (x-4)^4(2x+3)^7$

c) $f(q) = \ln(e^q - 2)$

d) $y = \frac{x^2(3x-4)^7}{e^{3x}}$, find $\frac{d^3 y}{dx^3}$ in its factored form.

3. Find the slope of the line tangent to the curve $y = x\sqrt{x^2 + 5}$ at $x = 2$. Then find the complete equation of the tangent line to the curve at $x=2$

4. Let $g(x) = x^3 + x^2 - 5x + 3$.

a) Find all critical points

b) Find all points of inflection.

c) Graph $g(x)$ and from the graph and the answer to part (1), state the intervals over which $g(x)$ is increasing and decreasing, concave up and concave down.

5. Integrate

a) $\int x^2 e^x dx$

b) $\int_0^1 \frac{y+1}{(y^2 + 2y + 6)^2} dy$