

Midterm Exam 1

Oct 27, 2015, 10:10AM

1. (X pts) Applications of product rule, quotient rule and Chain Rule on prescribed functions (combination of elementary functions).
2. (X pts)
Similar problems and variant of $\lim_{y \rightarrow 0} \frac{\sin y}{y}$.
3. (X pts)
Give formal definition of $\lim_{x \rightarrow \dots} f(x) = \dots$. Here \dots could be any real number, $\pm\infty$ or one-sided versions. Apply it to concrete examples of f and verify using the $\varepsilon - \delta$ argument.
4. (X pts) More advanced $\varepsilon - \delta$ arguments. such as the $\varepsilon/2$ arguments, and the proof of the continuity of composite functions.
5. (X pts) Understand how to give definition of $\lim_{x \rightarrow c} f(x) \neq L$ and verify it with a prescribed c, f and L .
6. (X pts)
Find dy/dx where $y = f(x)^{g(x)}$.
7. (X pts)
Find y' and y'', \dots at (x_0, y_0) where $y(x)$ is implicitly given by $F(x, y) = 0$ near (x_0, y_0) .
8. Statement and applications of Intermediate Value Theorem.
9. (X pts) Find $\frac{d^n}{dx^n}(f(x)g(x))$
10. (X pts) Find $\frac{d}{dx}(f_1(x)f_2(x) \cdots f_n(x))$, $\frac{d}{dx}$ determinant), etc
11. (X pts) Study the derivation of derivative of inverse functions. Take the inverse trigonometric functions as example. Start with proper choice of domain for the original trigonometric functions and proceed.