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Math 121 - Calculus I

Topics Covered

Midterm 1

- Graphs of familiar functions. Stretching and shifting familiar graphs. Composition of functions.
- Natural exponential function e^x: graph, properties, working with rules of exponents, relationship to $\ln x$.
- Natural logarithm function $\ln x$: graph, properties, working with rules of logarithms, relationship to e^x.
- Inverse functions: one-to-one functions, concept of inverse, graphing, solving algebraically for inverse function.
- Introduction to derivatives: tangent line as limit of secant lines, instantaneous velocity as limit of average velocities, instantaneous velocity as slope of tangent line of position graph.
- Limits: intuitive notion, notation, infinite limits (vertical asymptotes), calculating limits, continuity, limits at infinity (horizontal asymptotes).

Midterm 2

- Limit definition of derivative at a point. Interpretation of derivative as instantaneous change. Finding the equation of a tangent line at a point.
- Differentiability. The derivative as a function. Graphical interpretation of the derivative function. When does differentiability fail to hold.
- Computing the derivative for simple functions (variations on x, x^2, $\sqrt{x}$, $\frac{1}{x}$, and $|x|$) using the limit definition of the derivative.
- Notation of differentiation. Higher-order differentiation.
- Computing derivatives of polynomials, natural exponential function, trig functions, and natural logarithm function.
- Product, quotient, and chain rules for differentiation.

- Implicit differentiation.

While I will not explicitly test the material from Midterm 1, these ideas might appear in problems on Midterm 2.