

Review for Test 3 Outline

I. Definitions and Terminology

A. First grade definitions for limit, continuity and derivative

B. Two definitions for derivative

$$\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} \quad \text{and} \quad \lim_{x \rightarrow a} \frac{f(x) - f(a)}{x - a}$$

C. Formal definition of continuity

1. $f(a)$ is defined No holes
2. $\lim_{x \rightarrow a} f(x)$ exists No jumps
3. $\lim_{x \rightarrow a} f(x) = f(a)$ No dot piecewise

D. Removable and nonremovable discontinuities

E. Symbols for derivative

F. Meaning of $\frac{c}{\infty}$

G. Difference between continuity and differentiability

1. Every differentiable fn is continuous.
2. BUT not every continuous fn is differentiable. Think of a counterexample.

II. Derivatives

A. Find $f'(x)$ using the formal definition (Sec 2.1)- 1 problem

B. Find $f'(x)$ using the rules (Sec 2.2)- 3 problems

C. Find $f'(x)$ at a point, for example $f'(2)$, (sec 2.2)- 2 problems

D. Find the equation of a tangent line (Sec 2.2)- 1 problem

E. Find the point(s), if any, at which there is a horizontal tangent (Sec 2.2)

F. Questions about absolute value fn and derivative

G. Use the formal definition of the derivative to PROVE ONE derivative rule.

III. Limits (2 questions)