

**DEFINITIONS YOU SHOULD KNOW
FOR THE 1ST MIDTERM**

LIMITS

Definition: If f is a function then we say that

$$\lim_{x \rightarrow a} f(x) = L$$

if for every $\varepsilon > 0$ one can find a $\delta > 0$ such that for all x

$$0 < |x - a| < \delta \implies |f(x) - L| < \varepsilon.$$

CONTINUITY

Definition: A function f is said to be continuous at some number a in the domain of f if

$$\lim_{x \rightarrow a} f(x) = f(a).$$

DIFFERENTIABILITY

Definition: A function f is said to be differentiable at some number a in the domain of f if the limit

$$\lim_{x \rightarrow a} \frac{f(x) - f(a)}{x - a}$$

exists. If the limit exists, it is called the derivative of f at a .