AP Calculus AB **Name (Print):** _____
2016-2017
Problem Set 1
Time Limit: 40 Minutes (Suggested)

This set contains 5 pages (including this cover) and 4 problems. These problems correspond to the topics taught in §1: Limits. The problems included here are similar to those that will be asked on the AP Test. All answers should be completed to the best of your ability with *all* work shown.

1. (5 points) What condition must be met for a limit to exist at a point x for a function $f(x)$?

2. Consider the function

$$f(x) = \begin{cases} x & x \leq -1 \\ x^2 - 1 & -1 < x \leq 1 \\ x & x > 1 \end{cases}$$

(a) (5 points) Find $\lim_{x \to 0} f(x)$.

(b) (5 points) Find $\lim_{x \to 1^+}$.

3. (15 points) Find $\lim_{x \to -1} \dfrac{\sin\left(\dfrac{1}{x-1}\right) e^x}{x}$

4. (10 points) Consider the function $f(x) = \dfrac{e^x}{x^{100}}$.

   (a) (5 points) Find $\lim_{x \to \infty} f(x)$.

   (b) (5 points) Find $\lim_{x \to -\infty} f(x)$.