

**AP Calculus AB**

**2016-2017**

**Problem Set 1**

**Time Limit: 15 Minutes (Suggested)**

**Name (Print):** \_\_\_\_\_

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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  $\lim_{x \rightarrow 0} f(x)$ .

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

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

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

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

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