

Name: \_\_\_\_\_

Panther ID: \_\_\_\_\_

**Homework 2 - Due Thursday, Sept. 17**

Calculus I

Fall 2015

1. (3 pts) Find, if possible, a value for the constant  $k$  which will make the function  $g(x)$  continuous everywhere.

$$g(x) = \begin{cases} \frac{1 - \cos(kx)}{x^2} & \text{if } x < 0 \\ 1 + \cos x & \text{if } x \geq 0 \end{cases},$$

2. (4 pts) True or False. Answer and briefly justify your answer in each case.

(a) If  $|f(x) + 5| \leq 7|x + 3|$  for all real  $x$ , then  $\lim_{x \rightarrow -3} f(x) = -5$ .

(b) If  $f(x)$  is continuous at  $x = 2$  and  $f(2) = 5$ , then for  $x$  sufficiently close to 2,  $f(x) < 5.002$ .

3. (4 pts) (a) Use IVT to show that the equation  $x^3 = 3x - 1$  has a solution in the interval  $[0, 1]$ .

(b) Use IVT to show that the equation  $x^3 = 3x - 1$  has three real solutions and find intervals of length 1 containing each solution.