Math 1450, Honor Calculus Practice 2, Fall 2016.

September 8, 2016

PSID: _____ Name: _____

1. For each of the following limits, determine if the limit is computing $f'(a)$ for some function $f(x)$ at the point where $x = a$. If it is, determine $f(x), a$ and $f'(a)$.

   i. $\lim_{x\to 0} \dfrac{\sqrt{x+4}-2}{x}$

   ii. $\lim_{h\to 0} \dfrac{\dfrac{2}{3+h} - \dfrac{1}{3}}{h}$

   iii. $\lim_{x\to \pi} \dfrac{\cos(x)+1}{x-\pi}$

   iv. $\lim_{h\to 0} \dfrac{(1+h)^2-1}{h}$

   v. $\lim_{x\to -1} \dfrac{\dfrac{1}{x-1} + \dfrac{1}{2}}{x+1}$

   vi. $\lim_{h\to 0} \dfrac{\sin(\pi+h)}{h}$

2. Prove that $\lim_{x \to 0} x^4 \cos(\frac{2}{x}) = 0$.

Thinking: How to use the same theorem as question 2 to prove $\lim_{x \to 0} \frac{\sin(x)}{x} = 1$?