NAME: _____ **Panther ID:** _____

Worksheet week 3 - MAC 2311, Fall 2014

1. Compute $\lim_{x\to 0} \dfrac{\sqrt{1+x^2}-\cos(3x)}{x^2}$

2. Decide whether the following statements are true or false. Briefly justify your answer.

(a) for every real number x, $x^2 < 100$

(b) for every real number x, $x^2 > -1$

(c) there exists a real number x, $x^2 < 1$

(d) for every real numbers x, y, $x^2 > y$

(e) for every real number x, there exists a real number y so that $x^2 < y$

(f) for every real number y, there exists a real number x so that $x^2 < y$

(g) for every positive real number y, there exists a real number x so that $x^2 < y$

3. Write the ϵ, δ definition for $\lim_{x\to a} f(x) = L$.

(a) Use the ϵ, δ definition to prove $\lim_{x\to 2}(2x+3) = 7$;

(b) Use the ϵ, δ definition to prove $\lim_{x\to 5}(100x-1) = 499$;

(c) Use the ϵ, δ definition to prove $\lim_{x\to 3} \dfrac{1}{x} = \dfrac{1}{3}$;