MATH 101 (141)
Practice Test

Q1. Find

$$\lim_{x\to 1} \frac{1-x}{2-\sqrt{x^2+3}}$$

Q2. Find

$$\lim_{x\to 0} \frac{3x+2-2\cos x}{6\sin x}$$

Q3. Evaluate the following limit

$$\lim_{x\to 2^-} \frac{|x^2-4|}{4-x^2}$$

Q4. Find a nonzero value for the constant k that makes $f(x)$ continuous at $x=0$, where

$$f(x) = \begin{cases} \frac{\tan kx}{x}, & x<0 \\ 3x+2k^2, & x\geq 0 \end{cases}$$

Q5. Show, by using the squeezing theorem, that

$$\lim_{x\to 0} x^2 \cos\frac{1}{x} = 0$$

Q6. Let

$$f(x) = \frac{3-x}{3+x} + \sqrt{\frac{x^2+1}{x^2+4}} + 3.$$

Evaluate $\lim_{x\to\infty} f(x)$

Q7. Let $p(x) = -3x^7 + 5x^2 + x - 10$. Find $\lim_{x\to-\infty} p(x)$

Q8. Given $\epsilon = 0.001$ and $f(x) = \frac{2x}{2x+1}$, let $L = \lim_{x\to+\infty} f(x)$. Find a positive number N such that $|f(x) - L| < \epsilon$ if $x > N$.

Q9. Use the $\epsilon - \delta$ definition to prove that $\lim_{x\to 4} \sqrt{x+5} = 3$

Q10. Evaluate

$$\lim_{x\to 0} \frac{\sin^2 3x}{\sin^2 5x}$$