

Math 113
Exam #1
(Chapter 2-Limits)
Due: Beginning of class July 18,2007

I pledge all work on this exam was done by me without the assistance of my classmates or any other individual. I realize that by cheating I am wasting both my time and money.
Signature _____

1) Complete the tables and use your result to estimate the limit.

a) $\lim_{x \rightarrow 0} \frac{\sin x}{x} =$

x	0.1	0.001	0.0001	-0.0001	-0.001	-0.1
f(x)						

b) $\lim_{x \rightarrow 0} (1 + x)^{1/x} =$

x	0.1	0.001	0.0001	-0.0001	-0.001	-0.1
f(x)						

What is the mathematical symbol for this value?

2) Find the limits:

a) $\lim_{\Delta x \rightarrow 0} \frac{\sqrt{x + \Delta x} - \sqrt{x}}{\Delta x}$

b) $\lim_{x \rightarrow 0} \frac{1 - \cos^2 x}{x}$ (Hint: Use your result from 1a)

3) For $f(x) = \frac{|x-3|}{x-3}$:

a) Draw a graph of $f(x)$:

b) Use **a** to find $\lim_{x \rightarrow 3^+} f(x) =$

c) Use **a** to find $\lim_{x \rightarrow 3^-} f(x) =$

d) Use your results from **b** and **c** to determine $\lim_{x \rightarrow 3} f(x) =$

e) Is this function continuous? Use the definition of continuity (pg. 90) to justify your answer?

4) Find **all** values of x for which the function $f(x) = \sec(x)$ is not continuous.

5) Let $f(x) = x^2 - 6x + 8$.

a) Use the intermediate value theorem to prove that this function crosses the x -axis on the interval $0 \leq x \leq 3$

b) Find the zero of the function guaranteed by the theorem.

6) Let $f(x) = \frac{x-3}{x^2-9}$

a) Find the domain of $f(x)$:

b) Find the values of which $f(x)$ is not continuous? Which of these values are removable?

c) Find any asymptotes to this function?

d) Use your answer from part c to determine the limit of $f(x)$ as it approaches the asymptote from the left hand side and the right hand side?