

MATH 170 – Section 006 – Quiz 3

You may work with other class members on this quiz, but you may *not* receive assistance from people not in your MATH 170 section. You must show all of your work to receive full credit. Do all your work on other sheets of paper and be sure to staple all the pieces of paper together or YOU WILL GET A ‘ZERO’ ON THE QUIZ. Do not use decimal approximations unless asked to do so. Your work on this quiz must be handed in by the beginning of class on Friday, 18 September 2009. GOOD LUCK!

Answers based on calculator experiments will not be accepted.

1) Let

$$f(x) = \begin{cases} x^2 & \text{if } x > 0 \\ 1 + x & \text{if } x \leq 0 \end{cases} .$$

Does $\lim_{x \rightarrow 0} f(x)$ exist? If yes, what is its value? If not, explain why does it not exist.

2) Let $f(x) = \sqrt{x}$. Evaluate:

$$\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

3) Let $g(x)$ be a function such that

$$\cos x \leq g(x) \leq x^2 + 1$$

for all values of x . Discuss $\lim_{x \rightarrow 0} g(x)$.

4) Use the “precise” definition of limit (Section 2.3 of the text) to prove:

$$\lim_{x \rightarrow 3} (5x - 2) = 13.$$

5) Let $f(x) = \frac{1}{x}$. What is the largest value of δ such that if x is within δ units of 4, then the corresponding value of $f(x)$ is within $\frac{1}{10}$ of a unit of $\frac{1}{4}$?