

MATH 170 – Section 006 – Quiz 4

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, 2 October 2009. GOOD LUCK!

1) Consider a function f that possesses the following properties:

- $\lim_{x \rightarrow \infty} f(x) = 3$
- $\lim_{x \rightarrow -\infty} f(x) = 3$
- $f(0) = 7$
- $\lim_{x \rightarrow 4} f(x) = \infty$

a) Draw the graph of such a function f .

b) Find a *non-piecewise* formula for the function f you drew in part a).

2) Let

$$f(x) = \begin{cases} \sin x & \text{if } x < 0 \\ \sin x & \text{if } 0 < x \leq 1 \\ \log_2 x & \text{if } 1 < x < 2 \\ 0 & \text{if } x = 2 \\ 3 - x & \text{if } x > 2 \end{cases}$$

a) Is f continuous at $x = 0$? Explain.

b) Is f continuous at $x = 1$? Explain.

c) Is f continuous at $x = 2$? Explain.

d) Is f continuous at $x = 3$? Explain.

3) Determine an interval on which the equation

$$x = \cos x$$

has a solution and prove your answer is correct.

4) Find an equation of the line tangent to $y = 3x - x^2$ at $x = -1$. You may not use techniques introduced after Chapter 2 of our text.