Friday 09/24/2010   Midterm I   10:30am–11:20am

Name: [   ]   Student ID: [   ]

Instructions.

1. Attempt all questions.

2. Do not write on back of exam sheets. Extra paper is available if you need it.

3. Show all the steps of your work clearly.

Question	Points	Your Score
Q1	15	
Q2	20	
Q3	20	
Q4	20	
Q5	15	
Q6	10	
TOTAL	100	

Q1]...[15 points] Let $f(x)$ be a function of x whose domain is all real numbers. Consider the following expression.

$$\frac{f(x) - f(2)}{x - 2}$$

What is this expression called?

Write down two interpretations of this expression.

Q2]... [20 points] For each of the two functions below, write down the **domain**, the **range** and **sketch the graph** of the function.

$$f(x) = |x - 2|$$

$$g(x) = |x| - 2$$

Q3]... [20 points] Compute the following limit. Show all the steps of your work.

$$\lim_{x \to 9} \frac{\frac{1}{\sqrt{x}} - \frac{1}{\sqrt{9}}}{x - 9}$$

Q4]... [20 points] Compute the following limit. Show all the steps of your work.

$$\lim_{h \to 0} \frac{(2+h)^3 - 8}{h}$$

Q5]... [15 points] Find the value of c which makes the following function continuous. Show the details of your reasoning. Keep in mind that the steps of your argument (how you arrived at a value for c) are more important than the actual value of c.

$$f(x) = \begin{cases} 2x + 4 & \text{for } x \leq 1 \\ cx^2 + c & \text{for } x > 1 \end{cases}$$

Q6].... [10 points] Suppose that $\sin(\theta) = 3/5$ and that $\pi/2 < \theta < \pi$. Find the values of $\cos(\theta)$ and of $\tan(\theta)$. Show the details of your work.