Math 161 Exam 1, Fall 2008

Show all work! No work, no credit. | Name:

Score	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
Tot	

1. The height of a particle is given by $h(t) = 128t - 16t^2$. Find:

   a) The average velocity in the interval $[0, 4]$.

   Ans:_____.

   b) The time(s) when the velocity is 0.

   Ans:_____.

2. Guess the limit. Show a table or a graph as appropriate.

   a) $\lim_{x\to 2}(x^3 - 8)/(x^2 - 4)$. (Numerically)

   Ans:_____.

   b) $\lim_{x\to 0}(\sin 2x/\sin 3x)$. (Graphically)

   Ans:_____.

3. Determine the following limits by any method:

   a) $\lim\limits_{x\to 5} \dfrac{x^2 + 25}{5 - x}$.

   Ans:_____.

   b) $\lim\limits_{x\to \infty} \dfrac{3x^3 - 6}{2x^3 + 9x}$.

   Ans:_____.

4. Evaluate the limit analytically, if it exists:

   a) $\lim\limits_{x\to 3} \dfrac{x^2 + x - 12}{x^2 - 3x}$.

   Ans:_____.

   b) $\lim\limits_{x\to 2} \dfrac{x^3 - 27}{x - 3}$.

   Ans:_____.

5. Using the ϵ, δ definition, prove rigorously that: $\lim\limits_{x\to 3}(2x + 3) = 9$.

Extra Space

M161x1F08	Name:

6. Evaluate the following limits analytically.

a) $\lim_{x\to 0} \dfrac{\sin 3x \cos x}{x}$

Ans:_____.

b) $\lim_{x\to 0} \dfrac{1-\cos^2 x}{4x^2}$

Ans:_____.

7. Find the value(s) of c which make the following functions continuous

a) $f(x) = \begin{cases} \dfrac{x^2-9}{x-3} & x \neq 3 \\ c & x = 3 \end{cases}$

Ans:_____.

b) $f(x) = \begin{cases} 5x & x < c \\ x+8 & x \geq c \end{cases}$

Ans:_____.

8. Use a limit definition to find the velocity of $f(t) = t^2 - 3t$ at the point $t = 2$.

Ans:_____.

9. Use the limit definition to find the derivative of $f(x) = 1/\sqrt{x}$

Ans:_____.

10. Find the derivative of the following functions:

a) $y = \dfrac{x^2-8}{x^2+8}$.

Ans:_____.

b) $y = \sin^5 x$.

Ans:_____.

Extra space.