

Math 161 Exam 1, Spring 2009

Show all work!		Name:	Score	
1.	The displacement of an object is given by $s = 1 + 2t + (t^2/4)$. Find the average velocity: a) In the interval $[1, 2]$. Ans: _____	b) In the interval $[1, 1.1]$. Ans: _____	1	
			2	
			3	
			4	
			5	
			6	
			7	
			8	
2.	Guess the limit. Show a table or a graph as appropriate. a) $\lim_{x \rightarrow 0} (\cos x - 1)/x^2$. (Numerically) Ans: _____	b) $\lim_{x \rightarrow 1^+} [x/(1-x)]$. (Graphically) Ans: _____	9	
			10	
			Tot	
3.	a) Find the limit step by step using the Limit Laws: a) $\lim_{x \rightarrow 3^+} \sqrt{x^2 - 9}$. Ans: _____	b) Find the limit by any method: b) $\lim_{x \rightarrow \infty} \frac{2x^2 + 1}{3x^2 - 5}$. Ans: _____		
4.	Evaluate the limit analytically, if it exists: a) $\lim_{x \rightarrow 3} \frac{x^2 + 2x - 15}{x - 3}$. Ans: _____	b) $\lim_{x \rightarrow 9} \frac{\sqrt{x} - 3}{x - 9}$. Ans: _____		
5.	Using the ϵ, δ definition, prove rigorously that: $\lim_{x \rightarrow 4} \left(\frac{x}{2} - 5\right) = -3$. 			
Extra Space				

M161x1S09	Name:
6.	<p>Explain why each of the following functions are discontinuous at $x = -3$.</p> <p>a) $f(x) = \ln x + 3$.</p> <p>b) $f(x) = \begin{cases} \frac{x^2 - x - 12}{x + 3} & x \neq -3 \\ -5 & x = -3 \end{cases}$</p>
7.	<p>Use a limit definition method to find the derivative of</p> $f(x) = \frac{1}{x - 1}$ <p style="text-align: right;">Ans: _____.</p>
8.	<p>Differentiate the following functions:</p> <p>a) $f(x) = \sqrt{5x} - 3e^x$.</p> <p>b) $f(x) = \sqrt{4 - x^2}$.</p> <p style="text-align: center;">Ans: _____.</p>
9.	<p>Differentiate the following functions:</p> <p>a) $f(x) = x^3e^{2x}$</p> <p>b) $f(x) = \frac{x}{x + 2}$</p> <p style="text-align: center;">Ans: _____.</p>
10.	<p>Differentiate the following functions:</p> <p>a) $f(x) = \sin^2(5x)$.</p> <p>b) $f(x) = \tan(e^{2x})$.</p> <p style="text-align: center;">Ans: _____.</p>
	<p>Extra space.</p>