

MATH 161 EXAM 3, FALL 2003

		Name:	Score		
1.	Find the local extrema of the following functions. a) $f(x) = 4x^2 - 12x + 26$. Ans: _____	b) $f(x) = 27x - x^3$. Ans: _____	1		
			2		
			3		
			4		
			5		
			6		
			7		
			8		
			9		
2.	Sketch the graph of $y = 1/(x^2 + 9)$. Show everything (ie: Max, min, IP's, asymptotes)	10			
		Tot			
		Max: _____	Min: _____	IP's: _____	Asymp: _____
3.	a) Use l'Hôpital's rule to find: $\lim_{x \rightarrow 0} \frac{e^x - 1}{x}$	a) Use l'Hôpital's rule to find: $\lim_{x \rightarrow 0^+} x \ln x$			
			Ans: _____		
4.	At each of the points in the graph below, classify y' and y'' as > 0 , < 0 or $= 0$.				
	a) y' _____, y'' _____				
	b) y' _____, y'' _____				
	c) y' _____, y'' _____				
	d) y' _____, y'' _____				
	e) y' _____, y'' _____				
5.	a) Let $f(x) = x^{2/3}$ on the interval $[-1, 8]$. a) Find the absolute extrema.	b) Show that $f(x) = 1/x^2$ is concave up for $x > 0$.			
			Ans: _____		

		Name:
6.	<p>A rectangular plot of land will be bounded on one side by a river and on the other three sides by a fence. With 800 m of fence at your disposal, what is the largest area you can enclose?</p> <p style="text-align: right;">Ans: _____.</p>	
7.	<p>Sand falls from a chute at the rate of $12 \text{ ft}^3/\text{s}$, onto a conical pile. The radius of the base is always one half the pile's height. How fast is the height growing when the pile is 5 ft high? ($V = \frac{1}{3}\pi r^2 h$)</p> <p style="text-align: right;">Ans: _____.</p>	
8.	<p>a) State precisely one theorem from this chapter.</p>	<p>b) Let $f(x) = 2x^2 - 5x + 1$. Find a "c" satisfying the MVT on $I = [1, 2]$.</p> <p style="text-align: right;">Ans: _____.</p>
9	<p>Find the antiderivative f.</p> <p>a) $f'(x) = \sqrt{x} - 3/x$</p>	<p>b) $f'(x) = 3e^x - 4\sec^2(x)$, $f(0) = 2$</p> <p style="text-align: right;">Ans: _____.</p>
10	<p>(T or F) a) If $f(a) = f(b) = 0$ then there exists a point $c \in (a, b)$ where $f'(c) = 0$.</p> <p>(T or F) b) $\frac{0}{0} = 0$</p> <p>(T or F) c) If $f'(c) = 0$ and $f''(c) = 0$ then $x = c$ is an inflection point.</p> <p>(T or F) d) If a function is decreasing, then it is concave down.</p> <p>(T or F) e) L'Hôpital's rule was discovered by L'Hôpital.</p>	
	<p>Extra space</p>	