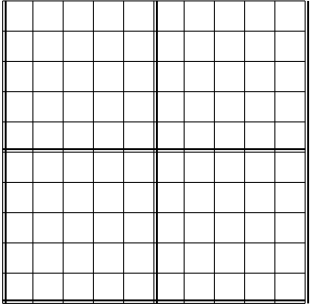


MATH 161 FINAL EXAM, FALL 2005

Part I. Basic skills. Pencil and paper only!		Name:	Score	
In problems 1-4, find the derivative y'			1	11
1.	a) $y = 4x^3 - (1/\sqrt{x})$	b) $y = \cosh(3z^3 - 1)$	2	12
			3	13
			4	14
			5	15
			6	16
			7	17
			8	18
			Ans: _____.	
2.	a) $y = e^{-2x} \cos(5x)$	b) $y = \tan^{-1}(\sin x)$	9	19
			10	20
			Tot	
			Ans: _____.	
3.	a) $y = x \sin^2 3x$	b) $y = \ln(\sec x)$	Ans: _____.	
			Ans: _____.	
4.	a) $y = \ln \frac{e^x(x-3)}{x^2+4}$	b) $x^3 - y^3 + y = 1$ (Implicit Differentiation)	Ans: _____.	
			Ans: _____.	
5.	a) Find: $\lim_{x \rightarrow 0} \frac{\sin 3x}{\sin 9x}$	b) Find: $\lim_{x \rightarrow \infty} \frac{4x}{\sqrt{9x^2+7}}$	Ans: _____.	
			Ans: _____.	
Extra Space				

In 6-9, find the given integrals.		Name:
6.	a) $\int \frac{4}{\sqrt{1-x^2}} dx.$	b) $\int t\sqrt{t^2+5} dt.$
	Ans:_____.	Ans:_____.
7.	a) $\int_0^{\pi/4} 4\sin^3 x \cos x dx.$	b) $\int_1^e \frac{\ln x}{x} dx.$
	Ans:_____.	Ans:_____.
8.	a) $\int_0^1 re^{-r^2} dr.$	b) $\int \frac{x^3}{1+x^4} dx.$
	Ans:_____.	Ans:_____.
9.	a) $\int \frac{x}{x+9} dx.$	b) $\frac{d}{dx} \int_1^{x^2} \frac{\sin x}{x} dt.$
	Ans:_____.	Ans:_____.
10	A flare is fired straight up in the air with a velocity of 14 m/s. a) What is the speed after 3 seconds?	b) What is the height after 3 seconds?
	Ans:_____.	Ans:_____.
	Extra Space	

Part II. Use of CAS permitted.		Name:
11	Find the extrema, IP's and asymptotes of $f(x) = \frac{x^2}{x^2 + 1}$. Graph the function	
	Max:..... min:.....	IP's:..... Asy:.....
12	An open-top box is to be made by cutting squares off the corners of a 12 x 12 in sheet of tin and bending up the sides. Find the dimensions that will result in a maximum volume.	
		Ans:.....
13	When a circular tortilla plate is heated, its radius increases at the rate of 0.01 cm/min. At what rate is the area increasing when the radius is 16 cm.	
		Ans:.....
14	a) State precisely the Mean Value Theorem.	b) Find the "c" of the MVT for $f(x) = x^2 - 4x$ on $[0, 2]$
		Ans:.....
15	Use logarithmic differentiation to find $f'(x)$. a) $f(x) = 5^x$.	b) $f(x) = (\ln x)^x$.
	Ans:.....	Ans:.....

Name: _____

16 Write the Riemann sum for the area under $f(x) = \sin x$ in the interval $[0, \pi]$.

17 Find the area bounded by $y = x + 2$ and $y = x^2 - 3x + 2$

a) Sketch the region and set up the integral.

b) Evaluate the integral.

Ans: _____.

18 The region bounded by $y = x^2$, $y = 2 - x$ and $x = 0$ is rotated about the x -axis. Find the volume.

Ans: _____.

19 The region bounded by $y = 2x - x^2$ and $y = 0$ is rotated about the y -axis. Find the volume.

Ans: _____.

20 A spring has a natural length of 0.50 m. A force of 8 N stretches the spring to a length of 0.60 m.

a) Find the spring constant.

b) Find the work required to stretch the spring from 0.60 m to 0.64 m.

Ans: _____.

Ans: _____.

Extra Space