MATH 161 FINAL EXAM, FALL 2008

Part I. Show all work! In pb. 1-4 find y'.

Name:

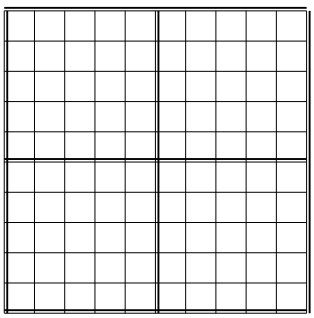
Score

1.	a) $y = x\sqrt{x} + \pi^2$. Ans:_____.	b) $y = \sec(1/x)$. Ans:_____.	1	11
			2	12
			3	13
			4	14
			5	15
			6	16
			7	17
2.	a) $y = t^3 e^{1/t^2}$. Ans:_____.	b) $y = \ln(\ln 8x)$. Ans:_____.	8	18
			9	19
			10	20
			Tot	
3.	a) $y = \sinh^{-1}(\sqrt{x})$. Ans:_____.	b) $y = \cos^4(3x)$. Ans:_____.		
4.	a) $y = \dfrac{2x}{(x^2-4)^2}$. Ans:_____.	b) $x^4 + y^4 = 4y$ (Implicit Differentiation.) Ans:_____.		
5.	a) Find: $\lim_{x\to 0} \dfrac{1-\cos 3x}{x^2}$. Ans:_____.	b) Find: $\lim_{x\to 0} \dfrac{\sqrt{1+x}-1}{3x}$. Ans:_____.		
	Extra Space			

In 6-9, find the given integrals.	Name:
6.	a) $\int (1+\sqrt{x})^2\,dx.$ Ans:_____.	b) $\int \sec 5t\,dt.$ Ans:_____.
7.	a) $\int x^{1/2}\sin(x^{3/2}+1)\,dx.$ Ans:_____.	b) $\int \sin^5\frac{x}{2}\cos\frac{x}{2}\,dx.$ Ans:_____.
8.	a) $\int \frac{z^3}{1+z^4}\,dz.$ Ans:_____.	b) $\int \frac{3x}{1-x^4}\,dx.$ Ans:_____.
9.	a) $\int_0^1 t^2\sqrt{1-t^3}\,dt$ Ans:_____.	b) $\frac{d}{dx}\int_1^{x^2}\sqrt{1-t^3}\,dt.$ Ans:_____.
10	A projectile is fired straight up in the air with a velocity of 64 m/s.	
	a) What is the velocity after 2 seconds? Ans:_____.	b) What is the height after 2 seconds? Ans:_____.
	Extra Space	

Part II. M161FinF08	**Name:**

11 Find the extrema, IP's and asymptotes of $f(x) = xe^{-x}$. 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 24×24 in sheet of tin and bending up the sides. Find the dimensions that will result in a maximum volume.

Ans:_____.

13 When an spherical balloon ($V = (4/3)\pi r^3$)is heated, its radius increases at the rate of 2 cm/min. At what rate is the volume increasing when the radius is 60 cm.

Ans:_____.

14 The position of a particle is given by $s(t) = 2t^2 - 8t$ in the interval $[1, 4]$

a) Find the average speed.

Ans:_____.

b) Find the "c" of the Mean Value Theorem.

Ans:_____.

15 Use logarithmic differentiation to find $f'(x)$.

$f(x) = (\sin x)^{x^2}$.

Ans:_____.

M161FinF08	**Name:**

16 Write the Riemann sum for the area under $f(x) = x^3 + 8x$ in the interval $[1, 2]$.

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

a) Sketch the region and set up the integral.

b) Evaluate the integral.

Ans:_____.

18 The region in the first quadrant bounded by $y = 4x - x^2$ is revolved about the y-axis. Find the volume.

Ans:_____.

19 The region in the first quadrant bounded by $x = y^2$, $x = 1$ and $x = 2$ is revolved about the y-axis. Find the volume.

Ans:_____.

20 Find a function that solves the differential equation:

a) $dy/dx = \sqrt{x}$.

Ans:_____.

b) $dy/dx = \sqrt{xy}$.

Ans:_____.

Extra Space