Due Date: November 24, 2010 Wednesday NAME:.....

Ali Sinan Sertöz STUDENT NO:.....

Math 113 Calculus – Homework 2

1	2	3	4	5	TOTAL
20	20	20	20	20	100

Please do not write anything inside the above boxes!

Check that there are 5 questions on your booklet. Write your name on top of every page. Show your work in reasonable detail, unless otherwise stated. A correct answer without proper or too much reasoning may not get any credit.

Q-1) Write the derivatives of the following functions. No partials. Do not show your work.

- $f(x) = x^{3x}, \quad f'(x) =$
- $f(x) = (\tan x)^{\sec x}, \quad f'(x) =$
- $f(x) = \ln(\cosh x^2), \quad f'(x) =$
- $f(x) = x \arctan x^2, \quad f'(x) =$
- $f(x) = x^{1/\ln x}, \quad f'(\pi) =$
- $f(x) = 5^x - x^5, \quad f'(x) =$
- $f(x) = x^{\ln x}, f'(e) =$
- $f(x) = \dfrac{x^6 - x^4 + 1}{4x^3 + x - 1}, f'(0) =$
- Given: $g(0) = 1,\ g(3) = 17,\ g(8) = 0,\ f(0) = 71,\ f(3) = -1,\ f(8) = \sqrt{2},$ $g'(0) = \pi,\ g'(3) = \pi^e,\ g'(8) = e,\ f'(0) = 2^e,\ f'(3) = \ln 3,\ f'(8) = e^{\sqrt{2}}.$

If $h(x) = f(3g(x) + 5)$, then $h'(0) =$

- Given: $f(5) = \pi/3,\ f'(5) = \pi/4,\ g(5) = 1,\ g'(5) = 0,\ g'(\sqrt{2}/2) = 5,$ $g'(\sqrt{3}/2) = 7,\ g(1/2) = \pi,\ g(\pi/4) = 11.$

If $h(x) = g(\sin(f(x)))$, then $h'(5) =$

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Q-2) Show that for any $x > -1$ and for any integer $n \geq 0$,

$$(1+x)^n \geq 1 + nx.$$

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Q-3) Sketch the graph of $f(x) = \dfrac{x+1}{x^2+1}$. Find the absolute minimum and maximum values of f.

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Q-4) Sketch the graph of $f(x) = x^2 e^{-x^2}$. Find the absolute minimum and maximum values of f.

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Q-5) Approximate $\tan 1$ with an absolute error less than $1/1000$, using the Taylor polynomials of $\sin x$ and $\cos x$.