

SHOW YOUR WORK

NO CALCULATORS

Mathematical Sciences 222

Calculus II

Fall 2004

First Exam

23 September

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Total value 200 points. Each part valued as marked. SHOW ANY WORK YOU DO!!

I. (80 points. 4 points each.)

1)  $(\ln x)' = ? \frac{1}{x}$

2)  $(\sin x)' = ? \cos x$

3)  $(\tan x)' = ? \sec^2 x$

4)  $(\cosh x)' = ? \sinh x$

5)  $\int (\cot u) du = ? \int \frac{\cos u}{\sin u} du = \ln |\sin u| + C$

6)  $(\arctan x)' = ? \frac{1}{1+x^2}$

7)  $(\tan^{-1}(\ln(\pi^2)))' = ? 0$

8)  $\int (\sec y) dy = ? \ln |\sec y + \tan y| + C$

9)  $\int \frac{dt}{\sqrt{1-t^2}} = ? \sin^{-1} t + C$

10)  $\int 3\pi^2 e^{(\pi^3)} dt = ? [3\pi^2 e^{(\pi^3)}] t + C$

11)  $\frac{d}{dx} \int_e^x f(u) du = ? f(x)$

12)  $\ln \sqrt{e} = ? \ln(e^{1/2}) = \frac{1}{2}$

13)  $\lim_{\theta \rightarrow 0} \frac{\sin(8\theta)}{\theta} = ? \lim_{\theta \rightarrow 0} 8 \frac{\sin(8\theta)}{8\theta} = 8 \cdot 1 = 8$

14)  $\cosh 0 = ? \frac{e^0 + e^{-0}}{2} = 1$

15)  $e^{\ln(3 \ln e)} = ? 3 \ln e = 3$

16)  $\tan^{-1}(\sqrt{3}) = ? \frac{\pi}{3}$

17)  $\cos(\sin^{-1} x) = ? \sqrt{1-x^2}$

18)  $\arcsin[\sin(3\pi/4)] = ? \sin^{-1} \frac{1}{\sqrt{2}} = \frac{\pi}{4}$

19)  $\lim_{n \rightarrow \infty} \left(1 + \frac{1}{n}\right)^n = ? e$

20)  $\log_3 81 = ? \log_3 (3^4) = 4$

