

Name: _____

TA (circle one): Jay Heumann

Ekin Ozman

Loizos Solomou

Mike Rose

September 29, 2005

Math 222

Shirin Malekpour

Exam I

I	15 Points	
II	20 Points	
III	20 Points	
IV	25 Points	
V	20 Points	
Total	100 Points	

WRITE YOUR NAME AND CIRCLE YOUR TA'S NAME ON EVERY ANSWER SHEET.
SHOW YOUR REASONING. YOU NEED TO SHOW WORK TO GET FULL CREDIT. NO CALCULATORS ARE ALLOWED. LEAVE YOUR ANSWERS IN FORM OF $\sqrt{2} + \pi^3$, $\ln(2)$, ETC. HERE ARE SOME USEFUL IDENTITIES:

$$\sin^2 x + \cos^2 x = 1, \quad \tan^2 x + 1 = \sec^2 x$$
$$\cos^2 x = \frac{1 + \cos(2x)}{2} \quad \sin^2 x = \frac{1 - \cos(2x)}{2}$$

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I. (15 points.) Find the indefinite integral

$$\int \sin(\ln x) dx.$$

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IV. (25 points.) Find the indefinite integral

$$\int \frac{x^2 + 3x + 1}{(x - 1)(x^2 + 2x + 2)} dx.$$

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V. (20 points.) Decide if the following improper integral is convergent or divergent.

$$\int_1^{\infty} \frac{x}{(1+x^2)^4} dx.$$