MATH 222-01 Pop Quiz II Fall 2010 Name ____________

1. Solve for x: $\log_x e^3 = 2 + \ln x$

2. Calculate the derivative:

a) $f(x) = \sin^{-1}(x\tan^{-1}x)$

$f'(x) =$

(b) $g(x) = \dfrac{e^{\sin^{-1}x}}{\log_2(x^2+1)}$

$g'(x) =$

3. (a) $\tan\left(\sin^{-1} 3/4\right) =$

(b) $\sin^{-1}\left(\sin\left(\frac{3\pi}{4}\right)\right) =$

4. $\displaystyle\int_1^{\sqrt{3}} \frac{1}{(x^2+1)\ \cancel{\arctan x}}\,dx$

(a) $$\lim_{x \to -1} \frac{\tan^{-1} x + \pi/4}{x + 1}$$

(b) $$\lim_{x \to -1} \arcsin\left(\frac{\tan^{-1} x + \pi/4}{x + 1}\right)$$

(c) $$\lim_{x \to 1^-} \frac{\tan^{-1} x + \pi/4}{x - 1}$$

(d) $$\lim_{x \to 0} (1 + \sin 2x)^{1/x}$$

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You may use backs of page - SHOW ALL YOUR WORK.

[5] 1. What is the definition for $ln\ x,\ x > 0$?

[16] 2. Solve for x:

a) $ln(x+1) - ln(x-1) = \log_2 4$

b) $\sin(\tan^{-1} x) = -1/3$

[24] 3. Calculate the indicated derivative (no need to simplify):

a) $f(x) = \arctan(lnx + 1)$

$f'(x) =$

b) $g(x) = x^{\pi} \cdot \pi^{x}$

$g'(x) =$

c) $h(x) = (x^2+1)^{\sinh x}$

$h'(x) =$

d) $j(x) = \frac{\sin^{-1} x}{\cosh x}$

$j'(x) =$

[10] 4. Evalute the integral:

$$\int_0^1 \frac{1+x}{1+x^2}\, dx$$

[6] 6. $\displaystyle \lim_{h\to 0} \frac{\left(\int_1^{2+h} \frac{1}{t}\,dt\right) - ln\ 2}{h} =$

[46] 7. Evaluate the following limits: [For limits that do not exist you can use DNE, but if appropriate, use $+\infty$ or $-\infty$.]

(a) $\displaystyle \lim_{x\to\pi/2^-} \frac{\cos x}{1-\sin x}$

(b) $\displaystyle \lim_{x\to\infty} x(e^{1/x}-1)$

(c) $\displaystyle \lim_{x\to\infty} \sqrt{x^2+3x}-\sqrt{x^2-x+5}$

(d) $\displaystyle \lim_{x\to 0+} x^x$

(e) $\displaystyle \lim_{x\to 0+} \left(\frac{\sin x}{x}\right)^{1/x}$

[56] 8. Evaluate the following integrals:

(a) $\displaystyle\int_0^{\pi/4} x\cos x\;dx$

(b) $\displaystyle\int \cos^{\pi} x\sin^3 x\;dx =$

(c) $\displaystyle\int \sec^4 x\tan^2 x\;dx =$

(d) $\displaystyle\int \sin^2 2x\;dx$

(e) $\displaystyle\int \frac{1}{(x^2+2x+2)^{3/2}}\;dx$

(f) $\displaystyle\int \frac{1}{\sqrt{5+4x-x^2}}\;dx$