Name:_____ Lecturer _____

Lecture Section: _____

Ma 221 Exam IB 14F

I pledge my honor that I have abided by the Stevens Honor System._____

You may not use a calculator, **cell phone**, **or computer while taking this exam**. **All work must be shown to obtain full credit**. **Credit will not be given for work not reasonably supported**. **When you finish**, **be sure to sign the pledge**.

Score on Problem #1 _____

#2 _____

#3 _____

#4 _____

Total Score _____

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Solve the following differential equations. Characterize your solution as explicit or implicit.

1 [25 **pts**.]

$$\frac{dy}{dx} = \frac{-y}{x} + \frac{4}{y^2}$$

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2 [25 **pts**.]

$$\frac{dy}{dx} = \frac{-\left[2x\sin\left(x^2+y^2\right)+3\cos(3x)\right]}{\left[2y\sin\left(x^2+y^2\right)+2\cos(2y)\right]}$$

.

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3 [25 **points**]

$$\frac{dy}{dx} = \frac{3y}{x} + x^3 \sin x \qquad y\left(\frac{\pi}{2}\right) = 8$$

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4 [25 **pts**.]

$$\frac{dy}{dx} = \frac{\sin^2 x}{\cos^2 y} \qquad y\left(\frac{\pi}{4}\right) = \frac{\pi}{4}$$

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Table of Integrals

$\int \sec^2 t dt = \tan t + C$
$\int \frac{\sec^2 t}{\tan t} dt = \ln(\tan t) + C$
$\int \tan t dt = \ln(\sec t) + C$
$\int te^{at} dt = \frac{1}{a^2} e^{at}(at - 1) + C$
$\int t^2 e^{at} dt = \frac{1}{a^3} e^{at}\left(a^2 t^2 - 2at + 2\right) + C$
$\int \cos^2 t dt = \frac{1}{2} t + \frac{1}{4} \sin 2t + C$
$\int \cos^3 t dt = \frac{1}{3} \cos^2 t \sin t + \frac{2}{3} \sin t + C$
$\int \sin^2 t dt = \frac{1}{2} t - \frac{1}{4} \pi - \frac{1}{4} \sin 2t + C$
$\int \sin^3 t dt = \frac{1}{12} \cos 3t - \frac{3}{4} \cos t + C$