MATHEMATICS 202
SPRING SEMESTER 2006-2007
MAKEUP-QUIZ I

Time: 80 MINUTES.

Date: March 26, 2007.

Name:——————————————————-

ID Number:——————————————————

Section Number:————————————————

Course Instructors: Professors A. Lyzzaik and H. Yamani

Question	Grade
1	/14
2	/14
3	/14
4	/14
5	/14
6	/14
7	/18
TOTAL	/100

Answer The Following Seven Questions On The Page Allocated For Each Question (You May Use The Back Of The Pages If Needed).

1. Solve the differential equation by finding an appropriate integrating factor

$$(y^2 + xy^3)\,dx + (5y^2 - xy + y^3 \sin y)\,dy = 0.$$

(14 points)

2. Solve the initial-value problem (14 points)

$$\frac{dy}{dx} = y(xy^3 - 1), \qquad y(0) = 1.$$

3. Solve the differential equation (14 points)

$$y(\ln x - \ln y)dx = (x\ln x - x\ln y - y)dy.$$

4. Solve the initial-value problem (14 points)

$$\frac{dy}{dx} = \cos(x + y), \qquad y(0) = \pi/4.$$

5. The functions $y(x) = x^4/16$, $-\infty < x < \infty$, and

$$y(x) = \begin{cases} 0, & x < 0 \\ x^4/16, & x \geq 0 \end{cases}$$

have the same domain but are clearly different. Show that both function are solutions to the initial-value problem $dy/dx = xy^{1/2}, y(2) = 1$. Does this contradict the existence and uniqueness theorem? Justify your answer.

(14 points)

6. Use Stoke's theorem to evaluate the flux of the vector field

$$\mathbf{F}(x,y,z) = x^2y\mathbf{i} + 2y^3z\mathbf{j} + 3z\mathbf{k}$$

across the surface with parametric equations

$$\mathbf{r}(r,\theta) = (r\cos\theta)\mathbf{i} + (r\sin\theta)\mathbf{j} + r\mathbf{k}.$$

$0 \leq r \leq 1$, $0 \leq \theta \leq 2\pi$. (14 points)

7. Find the area of the surface cut from the hemisphere $x^2+y^2+z^2 = 4$, $z \geq 0$, by the cylinder $x^2 + y^2 = 2x$. (16 points)