MATH 240 - Spring 2011
Practice Midterm Two

Name:

TA:

Recitation Time:

You may use both sides of a 8.5×11 sheet of paper for notes while you take this exam. No calculators, no course notes, no books, no help from your neighbors. Show all work, even on multiple choice or short answer questions—I will be grading as much on the basis of work shown as on the end result. Remember to put your name at the top of this page. Good luck.

Problem	**Score (out of)**
1	
2	
3	
4	
5	
6	
7	
Total	

1. Find the general solution to the following differential equation.

$$y^{(4)} + y''' + y'' = 0$$

2.Solve the following IVP given $y(0) = 1$ and $y'(0) = 0$.

$$y'' + 16y = 2cos(4x)$$

3.Evaluate the surface integral $\int\int_S G(x,y,z)dS$ given $G(x,y,z) = xy$ and S is the portion of the paraboloid $2z = 1 + x^2 + y^2$ in the first octant bounded by $0 \leq x \leq 1$ and $0 \leq y \leq 1$.

4. Suppose there is a spring-mass system at rest at equilibrium with a mass of 2 kilograms attached to a spring with spring constant 32 $\frac{N}{m}$. Starting at time $t = 0$ a force of $f(t) = 68e^{-2t}cos(4t)$ is applied. Find the equation of motion in the absence of damping.

5.Find the general solution to $(x+a)^2y'' + (x+a)y' - y = 0$. Note, your answer will incorporate the variable a.

6.Find all $g(y)$ such that the following line integral is path independent.

$$\int_{(0,0,0)}^{(2,4,8)} [y^2x + g(y)]dx + [x^2y + xcos(y)]dy + ln((cos(z)^2 + 1)dz$$

7. Evaluate the following line integral where C is the boundary of the region determined by the graphs of $x = 0$, $x^2 + y^2 = 1$ and $x \geq 0$

$$\oint_C [xy + ln(cos(e^{x^2} + 2))]dx + x^2 dy$$