Name: _____ **ID Number:** _____

TA: _____ **Section Time:** _____

MTH 235	***No notes. No books. No Calculators.***
Exam 3 Makeup	***If any question is not clear, ask for clarification.***
April 15, 2010	***No credit will be given for illegible solutions.***
50 minutes	***If you present different answers for the same problem,***
Sects: 6.1-6.6,	***the worst answer will be graded.***
7.1-7.6, 7.8.	***Show all your work.*** ***Box your answers.***

1. (20 points) Use the Laplace transform to find the solution y to the initial value problem

$$y'' + 2y' - 3y = 0, \qquad y(0) = 1, \qquad y'(0) = 3.$$

2. (20 points) Use the Laplace transform to find the solution y to the initial value problem

$$y'' + 2y = -3\,\delta(t-5), \qquad y(0) = 0, \qquad y'(0) = 2.$$

3. (15 points) Use convolutions to express the function f having the Laplace transform

$$\mathcal{L}[f(t)] = \frac{1}{s^5\left[(s-3)^2-4\right]}.$$

4. (a) (20 points) Find the general solution $\boldsymbol{x}$ to the 2×2 linear system

$$\boldsymbol{x}'(t) = A\,\boldsymbol{x}(t), \qquad A = \begin{bmatrix} 2 & -5 \\ 1 & -2 \end{bmatrix}.$$

(b) (5 points) Sketch a qualitative phase portrait of the solution trajectories.

5. (20 points) Find the solution $\boldsymbol{x}$ to the initial value problem

$$\boldsymbol{x}'(t) = A\,\boldsymbol{x}(t), \qquad \boldsymbol{x}(0) = \begin{bmatrix} 2 \\ 1 \end{bmatrix}, \qquad A = \begin{bmatrix} 3 & -18 \\ 2 & -9 \end{bmatrix}.$$

#	Pts	Score
1	20	
2	20	
3	15	
4	25	
5	20	
Σ	100	