EXAM 3 - MATH 310

Friday, November 10

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YOUR NAME:_____

Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Find the general solution of

$$2y''' + 4y'' + y' - y = -7e^{-t}.$$

2. Use Laplace transforms to solve the initial value problem

$$y'' - 2y' = \sin t, \quad y(0) = 0, \quad y'(0) = 0.$$

3. Find the Laplace transform $F(s)$ of $f(t) = \begin{cases} -2, & \text{if } 0 \le t < 1 \\ e^{t-3}, & \text{if } t \ge 1 \end{cases}$

4. Find the inverse Laplace transforms:

   (i) $g(t)$ of $G(s) = \frac{s+1}{s^2+1}$.

   (ii) $h(t)$ of $H(s) = \frac{1}{s(s^2+1)}$.

5. Solve the initial value problem

$$y'' + y = u_2(t) - u_7(t), \quad y(0) = 1, \quad y'(0) = 1.$$