MA 341-001 Test 2

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Use your own paper to work the problems. On all problems, show your work.

When you finish, fold this paper lengthwise together with your work, so that this writing is on the outside. Write your name and row number above, and turn in.

1. Determine the form you would use for a particular solution in the method of undetermined coefficients. Do not solve for the coefficients.
   
   (a) \( y'' - 9y = te^{-3t} \)
   (b) \( y'' - 9y = 2e^{-3t} \cos 2t \)

2. Find the general solution using the method of undetermined coefficients.
   
   \( y'' + 4y' + 20y = 20t^2 + 48t \)

3. Use variation of parameters to find a particular solution of
   
   \( y'' + y = \frac{1}{\cos t} \)

4. Find \( Y(s) \), the Laplace transform of the solution \( y(t) \) of the following initial value problem. Write \( Y(s) \) as one polynomial divided by another, with the denominator factored. Do not find the inverse transform \( y(t) \).
   
   \( y'' - 4y = te^{-2t} \)
   
   \( y(0) = 1, \quad y'(0) = 0 \)

5. Find the inverse Laplace transform of the following functions.
   
   (a) \( \frac{2s-1}{s^2+6s+13} \)
   (b) \( \frac{s^2+4}{s(s-2)^2} \)
   (c) \( \frac{e^{-\pi s}}{s^2} \)