

MATH 2171

Test 2

Spring 2001

Name : _____

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1. Find the general solution of the following differential equations:

(a) $16y'' + 8y' + y = 0$;

(b) $y'' - 2y' + 5y = 0$.

2. Find the solution of the initial-value problem :

$$y'' - 3y' + 2y = 0, \quad y(0) = 3, \quad y'(0) = 5.$$

3. Determine the form of a particular solution for each of the following equations

(a) $y'' - 4y = t^2 e^{4t} + 3 \sin t$;

(b) $y'' + 6y' + 9y = t e^{-3t}$.

4. Find a particular solution to the following equation using the method of undetermined coefficients

$$y'' + 3y' + 2y = 3e^{2t} - 10 \sin t.$$

5. Find a particular solution to the following equation using the method of variation of parameters

$$y'' + 4y = 8 \tan(2t).$$

(Hint : $\int \frac{du}{\cos u} = \ln(\sec u + \tan u).$)

6. A mass weighing 16 lb stretches a spring $32/170$ ft. The mass is attached to a viscous damper with a damping constant of 1 lb-sec/ft. If the mass is set in motion from its equilibrium position with a downward velocity of $13/4$ ft/sec. Find its position u at any time t .