

Due Thursday, March 10 at the beginning of class.

1. Find the general solution of the equation

$$y'' - 3y' + 2y = e^t \sin t$$

2. Determine the form of a particular solution for the differential equations.

(a)  $y'' + y = \sin t + t \cos t + e^t$ .

(b)  $y'' - y' - 2y = e^t \cos t - t^2 + t + 1$ .

3. Find the general solution of the differential equation using the method of variation of parameters.

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

(b)  $y'' - 2y' + y = \frac{e^x}{x}$

4. A mass weighting 2 lb stretches a spring 6 in. If the mass is pulled down an additional 3 in and then released, and if there is no damping, find

(a) the position  $y$  of the mass at any time  $t$ .

(b) frequency, period, and amplitude of the motion.

(c) How long does it take for the mass to pass the equilibrium point?

5. A series circuit has a capacitor of  $10^{-5}$  F, a resistor of  $3 \times 10^2 \Omega$ , and an inductor of 0.2 H. The initial charge on the capacitor is  $10^{-6}$  C and there is no initial current. Find the charge  $Q$  on the capacitor at any time  $t$ .