M242 Take Home Quiz 2

Show all work! When using the TI, give all commands and outputs.

1. Find the general solution to each DE below
   a. \( y'' + 5y' + 4y = 10 \sin(t) \)
   b. \( y'' - 7y' + 6y = 3e^t \)

2. For each of the two mass-spring systems described below:
   i) Spring constant of 50 newtons/m, a mass of 1 kg, and no damping. The mass is displaced 2 meters, and released with an initial velocity of -1 meters/sec.
   ii) Spring constant of 10 newtons/m, a mass of 1 kg and a damping constant of 8 newton-secs/meter. The mass is given an initial velocity of 3 meters/sec and no initial displacement.
   a. Give the differential equation and initial conditions that apply.
   b. Solve the differential equation from part a. to get the position \( x \) as a function of time \( t \). Give the solution in decimal form with 3 digit accuracy.
   c. Determine whether or not there will be oscillations. If there are oscillations, determine the amplitude and frequency (decimal form with 3 digit accuracy)