1. Solve the following differential equations:
   a. \( 5 \times 10^{-3} \ddot{y} + 10y = 0 \) with initial condition \( y(0) = 1.8 \).
   b. \( 100 \times 10^{-3} \ddot{y} + 20y = 0 \) with initial condition \( y(0) = 160 \times 10^{-3} \).
   c. \( 100 \times 10^{-3} \ddot{y} + 5 \times 10^{3} y = 0 \) with initial condition \( y(0) = 20 \).

2. Solve the following differential equations:
   a. \( 40 \times 10^{-3} \ddot{y} + 40y = 200 \) with initial condition \( y(0) = 20 \).
   b. \( 100 \times 10^{-3} \ddot{y} + 8y = -80 \) with initial condition \( y(0) = 15 \).
   c. \( 12.5 \ddot{y} + 4 \times 10^{3} y = 144 \times 10^{3} \) with initial condition \( y(0) = 0 \).

3. Find the general solution of the following differential equations (do not solve for the arbitrary constants in the natural solution):
   a. \( \ddot{y} + 5 \dot{y} + 6y = 0 \)
   b. \( \ddot{y} + 2 \dot{y} + y = 0 \)
   c. \( 2 \ddot{y} + 2 \dot{y} + 3y = 0 \)

4. Solve the following differential equations, evaluating all constants in the natural solutions.
   a. \( \ddot{y} + \dot{y} + 25.25y = 0 \) with initial conditions \( y(0) = 0 \) and \( \dot{y}(0) = 50 \).
   b. \( \ddot{y} + 4000 \dot{y} + 4 \times 10^{6} y = 0 \) with initial conditions \( y(0) = -15 \) and \( \dot{y}(0) = 110 \times 10^{3} \).
   c. \( \ddot{y} + 2500 \dot{y} + 10^{6} y = 0 \) with initial conditions \( y(0) = 0 \) and \( \dot{y}(0) = 98 \times 10^{3} \).