1. Solve the following first order ODE subject to the initial condition $y(2) = 10$ : $rac{dy}{dx} + rac{4}{x}y = 7x^2$.

2. Find an implicit formula for the curve which passes through the point $(1, -2)$ and satisfies the ODE $\frac{dy}{dx} = \frac{x^2 - 2xy}{x^2 - y^2}$. 
3. Solve the following second order ODE subject to the initial conditions \( y(0) = 3, \ y'(0) = -2 \):

\[
\frac{d^2 y}{dx^2} + 6 \frac{dy}{dx} + 8y = 8e^{-2x}.
\]

4. Solve the following second order ODE subject to the initial conditions \( y(0) = -2, \ y'(0) = 6 \):

\[
\frac{d^2 y}{dt^2} + 6 \frac{dy}{dt} + 13y = 75\sin(2t).
\]