

EXAM 1

1. Find a general solution for the ordinary differential equation

$$2y\cos^2(x)\frac{dy}{dx} = 1 + y^2\sin(2x).$$

2. Find a general solution for the ordinary differential equation

$$(y + x)\frac{dy}{dx} = x - y$$

3. Find a solution for the initial value differential problem

$$x^2\frac{dy}{dx} + xy + 1 = 0, \quad y(1) = 1.$$

4. Half-life of some radioactive material is 30 days. Find the time when 99 % of initial amount of this radioactive material is decayed.