Practice Assignment 2A

1. Verify that $y = e^{-x} + 1$ is a solution of the differential equation $y'' + y' = 0$.

2. Verify that $y - \cos y = 2x$ is a solution of the differential equation $(y \sin y + \cos y + 2x)y' = 2y$.

3. Form a differential equation representing the family of curves $\frac{2x}{a} + \frac{2y}{b} = 1$ by eliminating arbitrary constants a and b.

4. Form a differential equation representing the family of curves $y = ae^{2x} + be^{-x}$ by eliminating arbitrary constants a and b.

5. Form the differential equation of the family of circles whose centres are at the x-axis and radius as b units.

6. Find the general solution of the differential equation

$$\frac{dy}{dx} = \frac{1-\cos 2x}{1+\cos 2x}.$$

7. Find the particular solution of the differential equation $\frac{dy}{dx} = y \cot x$ given that $y = 1$ when $x = \frac{\pi}{2}$.

8. Show that the differential equation $(x^2 - xy)dy = (x^2 - y^2)dx$ is homogeneous and solve it.

9. Show that the differential equation $(2x - y)dy - (x + 2y)dx = 0$ is homogeneous and solve it.

10. Find a particular solution of given differential equation satisfying the given condition

$\frac{dy}{dx} + 2y \cot x = \text{cosec}$; $y = 0$. when $x = \frac{\pi}{6}$.