SARDAR VALLABHBHAI PATEL INSTITUTE OF TECHNOLOGY
VASAD
B. E. Third Semester (2017-18)
Subject: Advanced Engineering Mathematics (2130002)

Tutorial: 1

1 Determine Order and Degree of the following Differential Equations.

(i) $\left(\frac{dy}{dx}\right)^2 = 5\sqrt{y} - 3x$

(ii) $3\left(\frac{d^2y}{dx^2}\right)^3 - 5\frac{dy}{dx} = 0$

(iii) $3\left(\frac{d^2y}{dx^2}\right)^3 - 5\sqrt{\frac{dy}{dx}} = 0$

(iv) $\left(\frac{d^2y}{dx^2}\right)^3 - \frac{5}{\left(\frac{d^2y}{dx^2}\right)} = 0$

2 Obtain the differential equation for $y = ae^{2x} + be^{-2x}$.

3 Form the differential equation of all circles of radius a.

4 Verify that $y = e^{-x}(a\cos x + b\sin x)$ is a solution of $y'' + 2y' + 2y = 0$ where a & b are Constants.

5 Verify that $(x-2)^2 + y^2 = 4$ is a solution of $\frac{dy}{dx} = \frac{y^2 - x^2}{2xy}$

6 Solve $xy\frac{dy}{dx} = 1 + x + y + xy$

7 Solve $\left(e^{2y} + 1\right)\cos x dx + 2e^y \sin x dy = 0$

8 Solve $\frac{dy}{dx} = 1 + x\tan(y - x)$

9 Solve $\frac{dy}{dx} = e^{2x-3y} + 4x^2e^{-3y}$

10 Solve $\frac{dy}{dx} = (4x + y + 1)^2$

11 Solve $\frac{(x-2y)}{(3x+y)}\frac{dy}{dx} = 3x^2 - 5xy - 2y^2$

12 Solve $\left(x^2 - y^2\right)dx = 2xydy$

13 Solve $\frac{dy}{dx} = \frac{y}{x} + x\sin\frac{y}{x}$

14 Solve $\left(y^2e^{xy^2} + 4x^3\right)dx + (2xye^{xy^2} - 3y^2)dy = 0$

15 Solve $\frac{dy}{dx} + \frac{y\cos x + \sin y + y}{\sin x + x\cos y + x} = 0$