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

Tutorial: 2

1 Solve $(xy\sin xy+\cos xy)ydx+(xy\sin xy-\cos xy)xdy=0$

2 Solve $(3x^2y^4+2xy)dx+(2x^3y^3-x^2)dy=0$

3 Solve $\frac{dy}{dx}+\frac{4x}{x^2+1}y=\frac{1}{(x^2+1)^3}$

4 Solve $(x+2y^3)\frac{dy}{dx}=y$

5 Solve $\left(1+x^2\right)\frac{dy}{dx}+y=\tan^{-1}x$

6 Solve $\frac{dy}{dx}+x\sin 2y=x^3\cos^2 y$

7 Solve $\frac{dz}{dx}+\frac{z}{x}\log z=\frac{z}{x}\left(\log z\right)^2$

8 Solve the following Initial Value Problem

(i) $\frac{dy}{dx}=\frac{y}{x}-\cos^2\frac{y}{x}$, given that y=0, when x=1

(ii) $\frac{2x}{y^3}+\frac{y^2-3x^2}{y^4}\cdot\frac{dy}{dx}=0$, given that y=1, when x=2

(iii) $\frac{dy}{dx}+\frac{y}{x}=x^2$, given that y=1, when x=1

9 Find the orthogonal trajectories of the family $ay^2=x^3$

10 Find the orthogonal trajectory of $y^2=4a(x+a)$

11 Find the orthogonal trajectories of $r=2a\cos\theta$

12 Find the orthogonal trajectory of the family of cardioids $r=a(1+\cos\theta)$, where a is a parameter.