

1. The differential equation $\frac{dy}{dx} = F(x, y)$ will not be a homogeneous differential equation, if $F(x, y)$ is:
 - (a) $\cos x - \sin(\frac{y}{x})$
 - (b) $\frac{y}{x}$
 - (c) $\frac{x^2+y^2}{xy}$
 - (d) $\cos^2(\frac{x}{y})$
2. The degree of the differential equation $(y'')^2 + (y')^3 = x \sin(y')^3$ is:
 - (a) 1
 - (b) 2
 - (c) 3
 - (d) not defined
3. If $y = \operatorname{cosec}(\cot^{-1} x)$, then prove that $\sqrt{1+x^2} \frac{dy}{dx} - x = 0$.
4. If $x = e^{\cos 3t}$ and $y = e^{\sin 3t}$, prove that $\frac{dy}{dx} = -\frac{y \log x}{x \log y}$.
5. Show that: $\frac{d}{dx}(|x|) = \frac{x}{|x|}, x \neq 0$.
6. Find the particular solution of the differential equation given by $2xy + y^2 - 2x^2 \frac{dy}{dx} = 0; y = 2$, when $x=1$.
7. Find the general solution of the differential equation:

$$ydx = (x + 2y^2)dy$$