

Worksheet – Advanced

Class XII

Chapter IX- Differential Equations

One Mark Question

1. The solution of the differential equation $\frac{dy}{dx} = \frac{-2xy}{x^2+4}$ is

(a) $y^2(x^2 + 4) = c$ (b) $y(x^2 + 4) = c$ (c) $x^2(y + 1) = c$

(d) $\log y = \frac{1}{2} \tan^{-1} \frac{x}{2} + c$

2. The order of the differential equation of family of curves

$y = (c_1 + c_2)x^2 + c_3e^{c_4+x}$ is

(a) 2 (b) 3 (c) 4 (d) 5

3. Find the order and degree of the differential eqn. $\frac{d^4y}{dx^4} + \sin\left(\frac{dy}{dx}\right) = 0$

4. Write the order of the differential eq. Formed from the eq. of line passing through (a,0) and (0,b).

Four Marks Questions

1. At any point (x,y) of a curve the slope of the tangent is twice the slope of line segment joining the point of contact to the point (-4,-3). Find the equation of the curve given that it passes through (-2,1).

2. Solve the initial value problem $(x \sin^2 \frac{y}{x} - y) dx + x dy = 0$, $y(1) = \frac{\pi}{4}$.

3. Solve $x \frac{dy}{dx} = y(\log y - \log x + 1)$.

4. Find the equation of a curve passing through the point (1,1). If tangent drawn at any point P(x,y) on the curve meets the co-ordinate axes at A and B such that P is the mid-point of AB.

5. Form the differential equation having $y = (\sin^{-1} x)^2 + A \cos^{-1} x + B$, where A and B are arbitrary constants, as its general solution.

6. If y(x) is a solution of the differential equation $\left(\frac{2+\sin x}{1+y}\right) \frac{dy}{dx} = -\cos x$ and $y(0) = 1$, then find the value of $y(\pi/2)$.

7. Solve the differential equation: $\sqrt{1+x^2+y^2+x^2y^2} + xy \frac{dy}{dx} = 0$.

8. Show that the differential equation representing one parameter family of curves $(x^2 - y^2) = c(x^2 + y^2)^2$ is $(x^3 - 3xy^2)dx = (y^3 - 3x^2y)dy$.