

MHT CET 2024 Mathematics Memory Based Question Paper PDF

Ques 1. If $y = \sec(\tan^{-1} x)$, then $\frac{dy}{dx}$ at $x = 1$ is:

- (1) $\frac{1}{2}$
- (2) 1
- (3) $\frac{1}{\sqrt{2}}$
- (4) 2

Ques 2. If $y = \log_e \left[e^{3x} \left(\frac{x-4}{x+3} \right)^{3/2} \right]$, then find $\frac{dy}{dx}$:

- (1) $3 + \frac{21}{2(x-4)(x+3)}$
- (2) $3 + \frac{21}{(x-4)(x+3)}$
- (3) $3 + \frac{21}{2(x+3)(x-4)}$
- (4) $3 + \frac{7}{(x-4)(x+3)}$

Ques 3. Find the differential equation of the family of all circles, whose center lies on the x-axis and touches the y-axis at the origin.

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

Ques 4. If $f(x) = 3x + 6$, $g(x) = 4x + k$, and $f \circ g(x) = g \circ f(x)$, then find k :

- (1) 3
- (2) 6
- (3) 9
- (4) 12