Differentiation

October 20, 2023

1. **Question(CBSE-papers-math-12-2022-65(B)-C-14):**

   The slope of the normal to the curve $y = 2x^2 + 3\sin x$ at $x = 0$ is _____.

   OR

   The total revenue (in ₹) received from sale of x units of a product is $R(x) = 3x^2 + 36x + 5$. The marginal revenue, when $x = 12$ is _____.

2. **Question(CBSE-papers-math-12-2022-65(B)-C-22):**

   If $sin y = x sin(a + y)$, then prove that $\frac{dy}{dx} = \frac{sin x^2(a+y)}{\sin a}$.

3. **Question(CBSE-papers-math-12-2022-65(B)-C-23):**

   Find the equation of tangent to the curve $y = x^2 + 4x + 1$ at the point(3,22).

4. **Question(CBSE-papers-math-12-2022-65(B)-C-28):**

   If $Y = \tan^{-1}\left(\frac{3x-x^3}{1-3x^2}\right), -\frac{1}{\sqrt{3}} < x < \frac{1}{\sqrt{3}}$ then find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$.

5. **Question(CBSE-papers-math-12-2022-65-C-3-6):**

   If $\sec^{-1}\left(\frac{1+x}{1-y}\right) = a$, then $\frac{dy}{dx}$ is equal to

6. **Question(CBSE-papers-math-12-2022-65-C-3-8):**

   The oder and degree of the differential equation of the family of parabolas having at organ and axis along positive x-axis is

7. **Question(CBSE-papers-math-2022-65-C-3-15):**

   If $y = \log x$, then $\frac{d^2 y}{dx^2} =$

8. **Question(CBSE-papers-math-2022-65-C-3-33):**

   Find the intervals in which the function f defined as $f(x) = \sin(x) + \cos(x)$, $0 \leqslant x \leqslant 2\pi$ is strictly increasing or decreasing.

   OR

   Prove that the radius of the right circular cylindar of greatest curved surface area which can be inscribed in a given cone is half of thatof the cone.

9. **Question(CBSE-papers-math-2022-65-C-3-36):**

   If $y = x^{\sin x} + \sin^{-1}(\sqrt{x})$, the find $\frac{dy}{dx}$.

10. **Question(CBSE-papers-math-2022-465-7):** The supply function of a commodity is $100p = (x+20)^2$. Find the Producer's Surplus(PS),whne the market price is ₹25.

    OR

    Find:

    $\int \frac{2x^2+1}{x^2-3x+2} \, dx$