TOPPERZ @ WORK EDUCATION CENTRE

Class: CBSE XII | Topic: Calculus

Subject: Mathematics | Time: 90 Min

1.

If $y = \tan^{-1}\left(\frac{\sqrt{1+x^2}+\sqrt{1-x^2}}{\sqrt{1+x^2}-\sqrt{1-x^2}}\right), x^2 \le 1,$ *then find* $\frac{dy}{dx}$

[4 marks]

2.

Find: $\int \frac{dx}{\sin x + \sin 2x}$

[4 marks]

3.

Integrate the following w.r.t.x

$$\frac{x^2-3x+1}{\sqrt{1-x^2}}$$

[4 marks]

4.

Evaluate: $\int_{-\pi}^{\pi} (\cos ax - \sin bx)^2 dx$ [4 marks]

5.

Solve the differential equation:

$(\tan^{-1} y - x)dy = (1+y^2)\,dx.$ [6 marks]

6.

Find the local maxima and local minima, of the function $f(x) = \sin x - \cos x, 0 < x < 2\pi$. Also, find the local maximum and local minimum values.

[6 marks]

7.

Using integration find the area of the triangle formed by positive x-axis and tangent and normal of the circle $x^2 + y^2 = 4$ at $(1, \sqrt{3})$.

[6 marks]

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8.

Using integration find the area of the triangle formed by the positive x-axis and tangent and normal to the circle $x^2 + y^2 = 4$ *at* $(1, \sqrt{3})$.

[6 marks]

9.

Evaluate: $\int_1^3 (e^{2-3x} + x^2 + 1)dx$ as a limit of a sum.

[6 marks]