



INDIAN SCHOOL DARSAIT DEPARTMENT OF MATHEMATICS



Subject :MATHEMATICS Topic :CONTINUITY & DIFFERENTIALITY (6)

Date :29-5-2017

Resource Person:PremelaIsac

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Name of the Student: _____

Class &Division

:Roll. Number:

Sl.No.	Questions	Marks
1.	Differentiate the following function with respect to $x : (x)^{\cos x} + (\sin x)^{\tan x}$.	4
2.	If $y = \frac{x}{2}\sqrt{a^2 - x^2} + \frac{a^2}{2}\sin^{-1}\frac{x}{a}$, then show that $\frac{dy}{dx} = \sqrt{a^2 - x^2}$	4
3.	If $y = \sin^{-1}\left[\frac{5x+12\sqrt{1-x^2}}{13}\right]$, then find $\frac{dy}{dx}$.	4
4.	If $y = A\cos(nx) + B\sin(nx)$, show that $\frac{d^2y}{dx^2} + n^2y = 0$.	4
5.	If $y = \log[\log(\log x^5)]$, then find $\frac{dy}{dx}$.	4
6.	If $y = \cos^{-1}\left(\frac{\sin x + \cos x}{\sqrt{2}}\right)$ where $-\frac{\pi}{4} < x < \frac{\pi}{4}$, then find $\frac{dy}{dx}$.	4
7.	If $y = \tan^{-1}\left(\frac{\sqrt{1+x^2} + \sqrt{1-x^2}}{\sqrt{1+x^2} - \sqrt{1-x^2}}\right)$, $x^2 \leq 1$, then find $\frac{dy}{dx}$.	4
8.	If $(ax + b)e^{\frac{y}{x}} = x$, then show that : $x^3\left(\frac{d^2y}{dx^2}\right) = \left(x\frac{dy}{dx} - y\right)^2$.	4
9.	If $\frac{x}{x-y} = \log\frac{a}{x-y}$, then prove that $\frac{dy}{dx} = 2 - \frac{x}{y}$.	4
10.	If $x \sin(a+y) + \sin a \cos(a+y) = 0$, then prove that $\frac{dy}{dx} = \frac{\sin^2(a+y)}{\sin a}$	4
11.	If $y = \sqrt{\tan x + \sqrt{\tan x + \sqrt{\tan x + \dots \text{to } \infty}}$, then prove that $\frac{dy}{dx} = \frac{\sec^2 x}{2y-1}$.	4
12.	If $y = \sqrt{x^2 + 1} - \log\left(\frac{1}{x} + \sqrt{1 + \frac{1}{x^2}}\right)$, then find $\frac{dy}{dx}$.	4

13.	If $y = e^x + e^{x^2} + \dots + e^5$, then find $\frac{dy}{dx}$.	4
14.	If $y = (\sin^{-1} x)^2$, then prove that $(1 - x^2)y_2 - xy_1 = 2$.	4
15.	If $y = \left[\sin \frac{x}{2} + \cos \frac{x}{2} \right]^2$, find $\frac{dy}{dx}$, at $x = \frac{\pi}{6}$.	4

Dear Children,
There is no substitute for hard work.
All the best. God Bless.