RAMAGYA SCHOOL, NOIDA

WORKSHEET, 2017-18

SUBJECT: MATHEMATICS

CLASS: XII **MONTH: MAY**

1) Find the value of k so that f(x) = $\begin{cases} \frac{\sqrt{1+kx}-\sqrt{1-kx}}{x} & , \text{if } -1 \le x \le 0 \\ \frac{2x+1}{x-2} & , \text{if } 0 \le x \le 1 \end{cases}$

2) Find the value of a for which the function f is defined as f(x) = $\begin{cases} a \sin\frac{\pi}{2}(x+1), & x \le 0 \\ \frac{\tan x - \sin x}{x^3} & , x > 0 \end{cases}$

3) Find all points of discontinuity of f, where f is defined as follows : f(x) = $\begin{cases} |x|+3, x \le -3 \\ -2x, -3 < x < 3 \\ 6x+2, x \ge 3 \end{cases}$

4) Differentiate $\cos^{-1}(\frac{x+\sqrt{1-x^2}}{\sqrt{2}})$ w.r.t. x

5) Differentiate $\tan^{-1}(\frac{2^{x+1}}{1-4^x})$ w.r.t. x

6) If $x^p y^q = (x+y)^{p+q}$, prove that $\frac{dy}{dx} = \frac{y}{x}$

7) Differentiate $(\tan^{-1}x)^{\cot x} + (\cot^{-1}x)^{\tan x}$

8) Find $\frac{dy}{dx}$, if y = $\sin^{-1}(\frac{2\theta}{1+\theta^2})$ and x = $\tan^{-1}(\frac{2\theta}{1-\theta^2})$

9) If y = log $(x + \sqrt{1+x^2})$, prove that $(1+x^2)\frac{d^2y}{dx^2} + x\frac{dy}{dx} = 0$

10) If y= sin(m $\sin^{-1}x$), show that (1-x^2) $\frac{d^2y}{dx^2} - x\frac{dy}{dx} + m^2y = 0$

11) Verify Mean Value Theorem, if f(x) = $x^3 - 5x^2 - 3x$ in the interval $[a,b]$,where a =1, b=3. Find c $\in (1,3)$ for which $f'(c) = 0$

12) If y = x sin y, prove that x$\frac{dy}{dx}$ =$\frac{y}{1-x\cos y}$

13) For which values of and b the function f(x) = $\begin{cases} x^2+2x, x \le 0 \\ ax+b, x > 0 \end{cases}$

14) A function f(x) is defined as follows: f(x) = $\begin{cases} x & , x < 1 \\ 2-x & , 1 \le x \le 2 \\ -2+3x-x^2, & x > 2 \end{cases}$

15) Differentiate $\sin^{-1}(\frac{3x+4\sqrt{1-x^2}}{5})$ w.r.t. x

16) Find $\frac{dy}{dx}$: log(x y) = $x^2 + y^2$

17) If x = tan($\frac{1}{a}$log y), then show that$(1+x^2)\frac{d^2y}{dx^2} + (2x-a)\frac{dy}{dx} = 0$

18) If $e^x + e^y = e^{x+y}$, prove that $\frac{dy}{dx} + e^{y-x} = 0$

19) Find $\frac{dy}{dx}$, if x y + x e^{-y}+ y e^x=x^2

20) Verify Rolle's Theorem for the function f(x) = $x^3 - 6x^2 + 11x - 6$ in the interval $[1,3]$
