

SAINIK SCHOOL GOPALGANJ

ASSIGNMENT ON CH -5 (DIFFERENTIATION)

CLASS- 12

- If  $x = t + \frac{1}{t}$ ,  $y = t - \frac{1}{t}$ . Then value of  $\frac{dx}{dt}$   
(a)  $\frac{t^2-1}{t^2}$  (b)  $\frac{t-1}{t}$  (c)  $t$  (d)  $\frac{1}{t}$ .
- If  $x = t + \frac{1}{t}$ ,  $y = t - \frac{1}{t}$ . Then value of  $\frac{dy}{dx}$  is  
(a)  $\frac{t^2+1}{t^2-1}$  (b)  $\frac{t-1}{t}$  (c)  $t$  (d)  $\frac{1}{t}$ .
- If  $x = t + \frac{1}{t}$ ,  $y = t - \frac{1}{t}$ . Then value of  $\frac{d^2y}{dx^2}$   
(a)  $-4t(t^2 - 1)^{-2}$  (b)  $-4t^3(t^2 - 1)^{-3}$  (c)  $4t(t^2 + 1)^{-2}$  (d)  $4t^3(t^2 + 1)^{-3}$
- The differential co-efficient of  $\tan^{-1}\left(\frac{\sin x + \cos x}{\cos x - \sin x}\right)$  w.r.t. 'x' is  
(a) 0 (b)  $\frac{1}{2}$  (c) 1 (d) None on these
- The 2<sup>nd</sup> order derivative of a  $\sin^3 t$  w.r.t.  $a \cos^3 t$  at  $t = \frac{\pi}{4}$  is  
(a)  $\frac{4\sqrt{2}}{3a}$  (b) 2 (c)  $\frac{1}{12a}$  (d) 0
- If  $e^{xy} - 4xy = 4$  then  $\frac{dy}{dx} = ?$   
(a)  $\frac{y}{x}$  (b)  $\frac{-y}{x}$  (c)  $\frac{x}{y}$  (d)  $\frac{-x}{y}$
- Differential co-efficient of  $\log_e(\sqrt{x-1} + \sqrt{x+1})$  w. r. t. x is:  
(a)  $\frac{1}{2\sqrt{x^2-1}}$  (b)  $\frac{1}{2\sqrt{x^2-1}}$  (c)  $\frac{1}{2\sqrt{x^2+1}}$  (d)  $\frac{1}{\sqrt{x-1}+\sqrt{x+1}}$
- If  $x^y = e^{x-y}$  then  $\frac{dy}{dx}$  is equal to:  
(a)  $\frac{2 \log x}{(1+\log x)^2}$  (b)  $\frac{\log x}{(1+\log x)}$   
(c)  $\frac{\log x}{(1+\log x)^2}$  (d) None of the above

9. If  $y = \log x^x$  then  $\frac{dy}{dx}$  is equal to:  
 (a)  $\log ex$  (b)  $\log \frac{e}{x}$  (c)  $\log \frac{x}{e}$  (d) 1
10. If  $y = \sin^{-1} x + \sin^{-1} \sqrt{1-x^2}$ , then what is  $\frac{dy}{dx}$  equal to?  
 (a)  $\cos^{-1} x + \cos^{-1} \sqrt{1-x^2}$  (b)  $\frac{1}{\cos x} + \frac{1}{\cos \sqrt{1-x^2}}$  (c)  $\frac{\pi}{2}$  (d) 0
11. If  $y = \sin^{-1} x + \sin^{-1} \sqrt{1-x^2}$ , then what is  $\frac{dy}{dx}$  ?
12. If  $y = \frac{1}{a-z}$ , then what is  $\frac{dz}{dy} =$
13. Show that I function differentiable at a, then it is continuous at a, but converse is not true.
14. Find the differential differential coefficient of  $f(x) = \log(\log x)$
15. If  $y = \cos^{-1} \left( \frac{1-\log x}{1+\log x} \right)$ , then find  $\frac{dy}{dx}$  at  $x = e$
16. If  $x\sqrt{1+y} + y\sqrt{1+x} = 0$ , then find  $\frac{dy}{dx}$
17. If  $y = x + e^x$ , then find the value of  $\frac{d^2y}{dx^2}$ .
18. Find the derivative of  $\sec^{-1} \left[ \frac{1}{2x^2-1} \right]$  with respect to  $\sqrt{1-x^2}$  at  $x = \frac{1}{2}$ .
19. Find the he derivative of  $\cot^{-1} x^{-1}$  w.r.t  $\cot^{-1} \sqrt{1-x^2}$ .
20. If  $x = a \cos^3 \theta$ ,  $y = a \sin^3 \theta$ , then find the value of  $\sqrt{1 + \left( \frac{dy}{dx} \right)^2}$ .

