

Topic :-DIFFERENTIATION

1. Let $f(x) = \frac{x^2}{1-x^{2n}}$, $x \neq 0, \pm 1$, then derivative of $f(x)$ with respect to x is

a) $\frac{2x}{(1-x^{2n})^2}$	b) $\frac{1}{(2+x^2)^3}$	c) $\frac{1}{(1-x^2)^2}$	d) $\frac{1}{(2-x^2)^2}$
------------------------------	--------------------------	--------------------------	--------------------------

2. If $f(x) = |x|^3$, then $f'(0)$ equal to

a) 0	b) 1/2	c) -1	d) $-\frac{1}{2}$
------	--------	-------	-------------------

3. The derivative of $\log |x|$ is

a) $\frac{1}{x}, x > 0$	b) $\frac{1}{ x }, x \neq 0$	c) $\frac{1}{x}, x \neq 0$	d) None of these
-------------------------	------------------------------	----------------------------	------------------

4. If $f(x) = \tan^{-1} \left\{ \frac{\log \left(\frac{e}{x^2} \right)}{\log (e x^2)} \right\} + \tan^{-1} \left(\frac{3+2 \log x}{1-6 \log x} \right)$, then $\frac{d^n y}{dx^n}$ is

a) $\tan^{-1} \{(\log x)^n\}$	b) 0	c) 1/2	d) None of these
-------------------------------	------	--------	------------------

5. If $f(x) = x + 2$, then $f'(f(x))$ at $x = 4$, is

a) 8	b) 1	c) 4	d) 5
------	------	------	------

6. If $f(x) = \log_e(\log_e x)$, then $f'(x)$ at $x = e$, is

a) 0	b) 1	c) $\frac{1}{e}$	d) $\frac{e}{2}$
------	------	------------------	------------------

7. If $\sin(x+y) + \cos(x+y) = \log(x+y)$, then $\frac{d^2 y}{dx^2}$ is

a) $\frac{-y}{x}$	b) 0	c) -1	d) 1
-------------------	------	-------	------

8. $10^{-x \tan x} \left[\frac{d}{dx} (10^{x \tan x}) \right]$ is equal to

a) $\tan x + x \sec^2 x$	b) $\ln 10 (\tan x + x \sec^2 x)$
c) $\ln 10 \left(\tan x + \frac{x}{\cos^2 x} + \tan x \sec x \right)$	d) $x \tan x \ln 10$

9. If $y = 1 - x + \frac{x^2}{2!} - \frac{x^3}{3!} + \frac{x^4}{4!} - \dots$, then $\frac{d^2 y}{dx^2}$ is equal to

a) $-x$	b) x	c) y	d) $-y$
---------	--------	--------	---------

10. Differential coefficient of $\sec^{-1} \frac{1}{2x^2-1}$ with respect to $\sqrt{1-x^2}$ at $x = \frac{1}{2}$ is equal to

- a) 2 b) 4 c) 6 d) 1

11. If $y = \cos 2x \cos 3x$, then y_n is equal to

- a) $6^n \cos\left(2x + \frac{n\pi}{2}\right) \cos\left(3x + \frac{n\pi}{2}\right)$
 b) $6^n \cos\left(2x + \frac{n\pi}{2}\right) \cos\left(\frac{3x + n\pi}{2}\right)$
 c) $\frac{1}{2} \left\{ 5^n \sin\left(5x + \frac{n\pi}{2}\right) + \sin\left(x + \frac{n\pi}{2}\right) \right\}$
 d) None of these

12. If $f(x) = \log_{x^2}(\log_e x)$, then $f'(x)$ at $x = e$ is

- a) 1 b) $\frac{1}{e}$ c) $\frac{1}{2e}$ d) 0

13. Let $f(x) = \sin x$, $g(x) = x^2$ and $h(x) = \log_e x$. If $F(x) = (h \circ g \circ f)(x)$, then $F''(x)$ is equal to

- a) $a \operatorname{cosec}^3 x$ b) $2 \cot x^2 - 4x^2 \operatorname{cosec}^2 x^2$ c) $2x \cot x^2$ d) $-2 \operatorname{cosec}^2 x$

14. $x = \cos^{-1}\left(\frac{1}{\sqrt{1+t^2}}\right)$, $y = \sin^{-1}\left(\frac{t}{\sqrt{1+t^2}}\right) \Rightarrow \frac{dy}{dx}$ is equal to

- a) 0 b) $\tan t$ c) 1 d) $\sin t \cos t$

15. If $y = \tan^{-1}\left(\frac{\log(e/x^2)}{\log(ex^2)}\right) + \tan^{-1}\left(\frac{3+2\log x}{1-6\log x}\right)$, then $\frac{d^2y}{dx^2}$ is equal to

- a) 2 b) 1 c) 0 d) -1

16. $\frac{d}{dx} \left[\sin^2 \cot^{-1} \left\{ \sqrt{\frac{1-x}{1+x}} \right\} \right]$ equals

- a) -1 b) $\frac{1}{2}$ c) $-\frac{1}{2}$ d) 1

17. If $f(x) = \left\{ \frac{\pi}{2} [x] - x^5 \right\}$, $1 < x < 2$ and $[\cdot]$ denotes the greatest integer function, then $f'\left(\sqrt{\frac{\pi}{2}}\right)$ is equal to

- a) 0 b) $5(\pi/2)^{4/5}$ c) $-5(\pi/2)^{4/5}$ d) None of these

18. Let f be twice differentiable function such that $f''(x) = -f(x)$, and $f'(x) = g(x)$, $h(x) = \{f(x)\}^2 + \{g(x)\}^2$. If $h(5) = 11$, then $h(10)$ is equal to

- a) 22 b) 11 c) 0 d) 20

19. $f(x) = \begin{vmatrix} x^3 & x^4 & 3x^2 \\ 1 & -6 & 4 \\ p & p^2 & p^3 \end{vmatrix}$, here p is a constant, then $\frac{d^4 f(x)}{dx^4}$ is

- a) Proportional to x^2 b) Proportional to x c) Proportional to x^3 d) A constant

20. If $y = x + e^x$, then $\frac{d^2x}{dy^2}$ is

- a) e^x b) $-\frac{e^x}{(1+e^x)^3}$ c) $-\frac{e^x}{(1+e^x)^2}$ d) $\frac{1}{(1+e^x)^2}$

PE