SESSION : 2025-26 **DPP**

CLASS : XIIth
SUBJECT : MATHS
DATE :
DPP NO. : 1

Topic :-DIFFERENTITATION

1. If $\square = (1+\square)(1+\square^2)(1+\square^4)\ldots(1+\square^{2\square})$, then the value of $\frac{\square\square}{\square\square}at\square = 0$ is
   a) 0 b) -1
   c) 1 d) None of these

2. If $\sqrt{1-\square^2}+\sqrt{1-\square^2} = \square(\square-\square)$, then $\frac{\square\square}{\square\square}$ equals
   a) $\sqrt{(1-\square^2)(1-\square^2)}$ b) $\sqrt{\frac{1-\square^2}{1-\square^2}}$
   c) $\sqrt{\frac{1-\square^2}{1-\square^2}}$ d) None of these

3. The derivative of $\square^{\square^3}$with respect tolog $\square$ is
   a) $\square^{\square^3}$ b) $3\square^2 2\square^{\square^3}$
   c) $3\square^3\square^{\square^3}$ d) $3\square^2\square^{\square^3}+3\square^2$

4. The rate of change of $\sqrt{(\square^2+16)}$ with respect to $\frac{\square}{\square-1}$ at $\square = 3$ is
   a) 2 b) $\frac{11}{5}$
   c) $-\frac{12}{5}$ d) -3

5. If $\square =\square\square\square\ \square\square\square\ (1+\square^2)\ \square\square\square\ \square =$ $\square-\square.\square h\square\square,\frac{\square\square}{\square\square}$ is equal to
   a) $\square^{\square}-1$ b) $\square^2-$
   1 c) $\frac{\sqrt{\square^{\square}-1}}{2}$ d) $\square^{\square}-\square$

6. If $\square = (1+\square)(1+\square^2)(1+\square^4)\ldots(1+\square^{2\square})$, then the value of $\left(\frac{\square\square}{\square\square}\right)_{\square=0}$ is
   a) 0 b) -1
   c) 1 d) 2

7. If $\square(\square) = (1-\square)^{\square}$, then the value of $\square(0)+\square'(0)+\frac{\square''(0)}{2!}+\cdots\frac{\square^{\square}(0)}{\square!}$, is
   a) $2^{\square}$ b) 0
   c) $2^{\square-1}$ d) None of these

8. If $\square(\square) = (\square\square\square\ \square\square\square\ \square)(\square\square\square\ \square\square\square\ \square)^{-1}+\frac{4\square}{4-\square^2}, \square h\square\square\square'(2)$ is equal to
   a) $\frac{1}{2}$ b) $-\frac{1}{2}$
   c) 1 d) -1

9. If $\square = \frac{3\square}{2}-\frac{3\square}{2}$, $\square h\square\square\frac{\square^2\square}{\square\square^2}$ is
   a) $-3\sqrt{1-\square^2}$ b) $9\square$
   c) $-9\square$ d) $3\sqrt{1-\square^2}$

10. If $\square(\square) = (\square), \square h\square\square\square'(\square)\square\square\ \square = \square$ is equal to
    a) 1 b) 2
    c) 0 d) $\frac{1}{\square}$

11. If $\square(\square) = \left\{\frac{1+(\square)^2}{1+(\square)^2}\right\}$, then $\square'(\square)$
    a) Does not exist b) Is equal to
    $\frac{2}{\square}$ c) Is equal to $\frac{1}{\square}$ d) Is equal to 1

12. If $\square(\square) = 1+\square\square+\frac{\square(\square-1)}{2}\square^2+\frac{\square(\square-1)(\square-2)}{6}\square^3+.\ldots+\square^{\square}, \square h\square\square\ \square''(1)$ is equal to
    a) $\square(\square-1)2^{\square-1}$ b) $(\square-1)2^{\square-1}$
    c) $\square(\square-1)2^{\square-2}$ d) $\square(\square-1)2^{\square}$

13. If $2^{\square}+2^{\square}=2^{\square+\square}$, then $\frac{\square\square}{\square\square}$ is equal to

a) $\frac{(2^{\square}+2^{\square})}{(2^{\square}-2^{\square})}$ b) $\frac{(2^{\square}+2^{\square})}{(1+2^{\square+\square})}$

c) $2^{\square-\square}\left(\frac{2^{\square}-1}{1-2^{\square}}\right)$ d) $\frac{2^{\square+\square}-2^{\square}}{2^{\square}}$

14. If $2\square^2 - 3\square\square + \square^2 + \square + 2\square - \square = 0$, then $\frac{\square\square}{\square\square} =$

a) $\frac{3\square-4\square-1}{2\square-3\square+2}$ b) $\frac{3\square+4\square+1}{2\square+3\square+2}$

c) $\frac{3\square-4\square+1}{2\square-3\square-2}$ d) $\frac{3\square-4\square+1}{2\square+3\square+2}$

15. If $sin\,\square\square\square\,\square + \square^{-\square\square\square\square\square\square\square\,\square} = \square$, then $\frac{\square\square}{\square\square}$ at $(1, \square)$ is

a) $sin\,\square\square\square\,\square$ b) $-\square$

$\square\square\square\ \square\square\square\ \square$ c) $\square$

d) $sin\,\square\square\square\,\square - \square\ \square\square\square\ \square\square\square\ \square$

16. $\frac{\square}{\square\square}\left[\left(\frac{\square-\square}{1+\square\square}\right)\right]$ is equal to

a) $-\frac{1}{1+\square^2}$ b) $\frac{1}{1+\square^2} -$

$\frac{1}{1+\square^2}$ c) $\frac{1}{1+\left(\frac{\square-\square}{1+\square\square}\right)^2}$ d) $\frac{-1}{\sqrt{1-\left(\frac{\square-\square}{1+\square\square}\right)^2}}$

17. If $\square = \left(\frac{\square\square\square\square\square\square\square\ \square-\square\square\square\square\square\square\square\ \square}{\square\square\square\square\square\square\square\ \square+\square\square\square\square\square\square\square\ \square}\right), \square h\square\ \frac{\square\square}{\square\square}$ is equal to

a) 2 b) -1

c) $\frac{\square}{\square}$ d) $\frac{\square}{\square}$

18. Let $\square = \square^{\square^{\square^{\cdots}}}$, then $\frac{\square\square}{\square\square}$ is equal to

a) $\square\square^{\square-1}$ b) $\frac{\square^2}{\square(1-\square\square\square\square\square\square\square\ \square)}$ c) $\frac{\square}{\square(1+\square\square\square\square\square\square\square\ \square)}$ d) None of these

19. If $\square^{\square}\square^{\square}\square^{\square} = \square, \square h\square\ \frac{\square\square}{\square\square}$ is equal to

a) $\left(\frac{1+\square\square\square\square\square\square\ \square}{1+\square\square\square\square\square\square\ \square}\right)$ b) $-\left(\frac{1+\square\square\square\square\square\square\ \square}{1+\square\square\square\square\square\square\ \square}\right)$ c) $\left(\frac{1+\square\square\square\square\square\square\ \square}{1+\square\square\square\square\square\square\ \square}\right)$

d) None of these

20. If $\square = \left(\frac{\sqrt{\square}+1}{\sqrt{\square}-1}\right) + \left(\frac{\sqrt{\square}-1}{\sqrt{\square}+1}\right)$, then $\frac{\square\square}{\square\square}$ equals

a) 1 b) 0

c) $\frac{\sqrt{\square}+1}{\sqrt{\square}-1}$ d) $\frac{\sqrt{\square}-1}{\sqrt{\square}+1}$

21. If $\square(\square) = \sqrt{\square^2 - 2\square + 1}$, then

a) $\square'(\square) = 1$ for all $\square$

b) $\square'(\square) = -1$ for all $\square \leq 1$

c) $\square'(\square) = 1$ for all $\square \geq 1$

d) None of these

22. If $\square = \left(\frac{\square}{\square}\right) + \left(\frac{\square}{\square}\right), \square h\square\ \square h\square\ \square\square\square\square\square\ \square\square\ \square\frac{\square\square}{\square\square} + \square\frac{\square\square}{\square\square}$ is

a) 0 b) 1

c) 2 d) None of these

23. If $\square(\square, \square) = \square\ \square\square\square\ \square\square\square\ \square + \square\ \square\square\square\ \square\square\square\ \square, \square h\square\ \square_{\square}\square_{\square} - \square_{\square}\ \square\square\square\ \square\square\square\ \square - \square_{\square}\ \square\square\square\ \square\square\square\ \square + \square\square\square\ \square\square\square\ \square\ \square\square\square\ \square\square\square\ \square$ is equal to

a) 0 b) -1

c) 1 d) 2

24. If $\square = \square\ \square\square\square\ \square\square\square\ 4\square + \square\ \square\square\square\ \square\square\square\ 4\square$, $\square h\square\ \frac{\square^2\square}{\square\square^2}$ is equal to

a) $-16\square$ b) $16\square$

c) $\square$ d) $-\square$

25. If $\square(\square)$ has a derivative at $\square = \square, \square h\square\ \frac{\square\square(\square)-\square\square(\square)}{\square-\square}$ is equal to

a) $\square(\square) - \square\square'(\square)$ b) $\square\square(\square) - \square'(\square)$ c) $\square(\square) + \square'(\square)$ d) $\square\square(\square) + \square'(\square)$

SESSION : 2025-26 **DPP**

CLASS : XIIth **SUBJECT : MATHS**

DATE :

DPP NO. : 2

Topic :-DIFFERENTITATION

1. If $f(x) = \sqrt{x^2 - 2x + 1}$, then
   a) $f'(x) = 1$for all x
   b) $f'(x) = -1$for all $x \leq 1$
   c) $f'(x) = 1$for all $x \geq 1$
   d) None of these

2. If $u = \left(\frac{x}{y}\right) + \left(\frac{y}{x}\right)$, *then the value of* $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$ is
   a) 0 b) 1
   c) 2 d) None of these

3. If $u(x, y) = y\ log\ log\ x + x\ log\ log\ y$, *then* $u_x u_y - u_x\ log\ log\ x - u_y\ log\ log\ y + log\ log\ x\ log\ log\ y$ is equal to
   a) 0 b) -1
   c) 1 d) 2

4. If $x = A\ cos\ cos\ 4t + B\ sin\ sin\ 4t$, *then* $\frac{d^2x}{dt^2}$ is equal to
   a) $-16x$ b) $16x$
   c) x d) $-x$

5. If $f(x)$ has a derivative at $x = a$, *then* $\frac{xf(a) - af(x)}{x - a}$ is equal to
   a) $f(a) - af'(a)$ b) $af(a) - f'(a)$ c) $f(a) + f'(a)$ d) $af(a) + f'(a)$

6. $\frac{d}{dx}[x^x + x^a + a^x + a^a] = \cdots, a$ is constant
   a) $x^x(1 + log\ log\ x) + a.x^{a-1}$
   b) $x^x(1 + log\ log\ x) + a\ .x^{a-1} + a^x\ log\ log\ a$
   c) $x^x(1 + log\ log\ x) + a^a\ (1 + log\ log\ a)$
   d) $x^x(1 + log\ log\ x\ ) + a^a(1 + log\ log\ a\ ) + ax^{a-1} + a^a(1 + log\ log\ a)$

7. If $y = a^x.b^{2x-1}$, *then* $\frac{d^2y}{dx^2}$ is
   a) $y^2\ log\ log\ ab^2$ b) $y\ log\ log\ ab^2$
   c) y^2 d) $y(log\ log\ ab^2)^{\ 2}$

8. If $f(x) = x + 2$, then the value of $f'[f(x)]$ at $x = 4$ is
   a) 8 b) 1
   c) 4 d) 5

9. If $ax^2 + 2hxy + by^2 = 1$, then $\frac{d^2y}{dx^2}$ equals
   a) $\frac{h^2+ab}{(hx+by)^3}$ b) $\frac{h^2-ab}{(hx+by)^2}$
   c) $\frac{h^2+ab}{(hx+by)^3}$ d) $\frac{h^2-ab}{(hx+by)^3}$

10. Let $f(x) = sin\ sin\ x, g(x) = x^2\ and\ h(x) = x.\ If\ F(x) = (hogof)(x)$, *then* $F''(x)$ is equal to
    a) $a\ cosec^3x$
    b) $2\ cot\ cot\ x^2 - 4x^2 cosec^2 x^2$

c) $2x$
$cot\ cot\ x^2$
d) $-2\ cosec^2\ x$

11. If $x + y = \frac{\pi}{2}, then \frac{dy}{dx}$ is equal to
a) $\frac{x}{y}$ b) $-\frac{x}{y}$
c) $\frac{y}{x}$ d) $-\frac{y}{x}$

12. If $y = (sec\ sec\ x - tan\ tan\ x)$, then $\frac{dy}{dx}$ is
a) 2 b) -2
c) $\frac{1}{2}$ d) $-\frac{1}{2}$

13. If $x = e^t\ sin\ sin\ t\ , y = e^t\ cos\ cos\ t$, then $\frac{d^2y}{dx^2}$ at $x = \pi$, is
a) $2e^{\pi}$ b) $\frac{1}{2}e^{\pi}$
c) $\frac{1}{2e^{\pi}}$ d) $\frac{2}{e^{\pi}}$

14. The derivative of $f(x) = 3|2 + x|$ at the point $x_0 = -3$, is
a) 3 b) -3
c) 0 d) Does not exist

15. If variables x and $y$are related by the equation $x = \int_0^y \frac{1}{\sqrt{1+9u^2}} du$, then $\frac{d^2y}{dx^2}$ is equal to
a) $\sqrt{1 + 9y^2}$ b) $\frac{1}{1+9y^2}$
c) $9y$ d) $\frac{1}{9}y$

16. If $f(x) = xx, then\ f'(1)$ is equal to
a) $\frac{1}{2} + \frac{\pi}{4}$ b) $-\frac{1}{2} +$
$\frac{\pi}{4}$ c) $-\frac{1}{2} - \frac{\pi}{4}$ d) $\frac{1}{2} - \frac{\pi}{4}$

17. If $f: (-1,1) \to R$ be a differentiable function with $f(0) = -1$ and $f'(0) = 1$. Let $g(x) = [f(2f(x) + 2)]^2$. Then, $g'(0)$ is equal to
a) 4 b) -4
c) 0 d) -2

18. The differential coefficient of the function $|x - 1| + |x - 3|$ at the point $x = 2$ is
a) -2 b) 0
c) 2 d) undefined

19. If $y = (sec\ sec\ x - tan\ tan\ x), then \frac{dy}{dx}$ is equal to
a) 2 b) -2
c) $\frac{1}{2}$ d) $-\frac{1}{2}$

20. If $x = a\theta, y = a\theta$, then $\frac{dy}{dx}$ at $\theta = \frac{3\pi}{4}$ is
a) -1 b) 1
c) $-a^2$ d) a^2

SESSION : 2025-26

DPP

DAILY PRACTICE PROBLEMS

CLASS : XIIth
SUBJECT : MATHS
DATE :
DPP NO. : 3

Topic :-DIFFERENTITATION

1. If $\sec\left(\frac{x^2-y^2}{x^2+y^2}\right) = e^a$, then $\frac{dy}{dx}$ is equal to
   a) $\frac{y^2}{x^2}$ b) $\frac{y}{x}$
   c) $\frac{x}{y}$ d) $\frac{x^2-y^2}{x^2+y^2}$

2. If $y = \frac{a+bx^{3/2}}{x^{5/4}}$ and $y' = 0$ at $x = 5$, then the ratio $a: b$ is equal to
   a) $\sqrt{5}: 1$ b) 5:2
   c) 3:5 d) 1:2

3. If $f(x) = be^{ax} + ae^{bx}$, then $f''(0)$ is equal to
   a) 0 b) $2ab$
   c) $ab(a+b)$ d) ab

4. If $x^m y^n = (x+y)^{m+n}$, then $(dy/dx)_{x=1,y=2}$ is equal to
   a) $1/2$ b) 2
   c) $2m/n$ d) $m/2n$

5. If $f(x)$ and g (x) are two functions with $g(x) = x - \frac{1}{x}$ and $fog\,(x) = x^3 - \frac{1}{x^3}$, then $f'(x)$ is
   a) $3x^2 + 3$ b) $x^2 - \frac{1}{x^2}$ c) $1 + \frac{1}{x^2}$ d) $3x^2 + \frac{3}{x^4}$

6. If a curve is given by $x = a\cos t + \frac{b}{2}\cos 2t$ and $y = a\sin t + \frac{b}{2}\sin 2t$, then the points for which $\frac{d^2y}{dx^2} = 0$ are given by
   a) $\sin t = \frac{2\,a^2+b^2}{3ab}$ b) $\cos t = -\frac{a^2+b^2}{3ab}$ c) $\tan t = a/b$ d) None of these

7. Let f be a twice differentiable function such that $f''(x) = -f(x)$ and $f'(x) = g(x)$. If $h'(x) = [f(x)^2 + g(x)^2]h(1) = 8$ and $h(0) = 2$, then $h(2)$ is equal to
   a) 1 b) 2
   c) 3 d) None of these

8. If $y = \log x^x$, then the value of $\frac{dy}{dx}$ is
   a) $x^x\,(1 + \log x)$ b) $\log(ex)$
   c) $\log\left(\frac{e}{x}\right)$ d) $\log\left(\frac{x}{e}\right)$

9. If $f''(x) = -f(x)$, where $f(x)$ is a continuous double differentiable function and $g(x) = f'(x)$. If $F(x) = \left(f\left(\frac{x}{2}\right)\right)^2 + \left(g\left(\frac{x}{2}\right)\right)^2$ and $F(5) = 5$ then $F(10)$ is
   a) 0 b) 5
   c) 10 d) 25

10. If $y = \sqrt{\sin x + \sqrt{\sin x + \sqrt{\sin x + \ldots \infty}}}$, then $\frac{dy}{dx}$ is equal to

a) $\frac{\cos x}{2y-1}$ b) $\frac{-\cos x}{2y-1}$

c) $\frac{\sin x}{1-2y}$ d) $\frac{-\sin x}{1-2y}$

11. If $y = x^2e^{mx}$, where m is a constant, then $\frac{d^3y}{dx^3}$ is equal to

a) $me^{mx}(m^2x^2 + 6mx +$

6) b) $2m^3xe^{mx}$

c) $me^{mx}(m^2x^2 + 2mx +$

2) d) None of these

12. If $x^2 + y^2 = t - \frac{1}{t}$ and $x^4 + y^4 = t^2 + \frac{1}{t^2}$, then $\frac{dy}{dx}$ is equal to

a) $\frac{1}{x^2y^3}$ b) $\frac{1}{xy^3}$

c) $\frac{1}{x^2y^2}$ d) $\frac{1}{x^3y}$

13. If $x = \sin^{-1}(3t - 4t^3)$ and $y = \cos^{-1}(\sqrt{1-t^2})$, then $\frac{dy}{dx}$ is equal to

a) $1/2$ b) $2/5$

c) $3/2$ d) $1/3$

14. If $f(x) = \sqrt{1 - \sin 2x}$, then $f'(x)$ equals

a) $-(\cos x + \sin x)$, for $x \in (\pi/4, \pi/2)$

b) $\cos x + \sin x$, for $x \in (0, \pi/4)$

c) $-(\cos x + \sin x)$, for $x \in (0, \pi/4)$

d) $\cos x - \sin x$, for $x \in (\pi/4, \pi/2)$

15. Derivative of $\sin x$ w.r.t. $\cos x$ is

a) $\cos x$ b) $\cot x$ c) $-\cot x$ d) $\tan x$

16. The derivative of $F[f\{\phi(x)\}]$ is

a) $F'[f\{\phi(x)\}]$

b) $F'[f\{\phi(x)\}]f\{\phi(x)\}$

c) $F'[f\{\phi(x)\}]f'\{\phi(x)\}$

d) $F'[f\{\phi(x)\}]f'\{\phi(x)\}\phi'(x)$

17. If $x\sqrt{1+y} + y\sqrt{1+x} = 0$, then $\frac{dy}{dx}$ is equal to

a) $\frac{1}{(1+x)^2}$ b) $-\frac{1}{(1+x)^2}$

c) $\frac{1}{1+x^2}$ d) $\frac{1}{1-x^2}$

18. If $\sec\left(\frac{x^2-y^2}{x^2+y^2}\right) = e^a$, then $\frac{dy}{dx}$ is equal to

a) $\frac{y^2}{x^2}$ b) $\frac{y}{x}$

c) $\frac{x}{y}$ d) $\frac{x^2-y^2}{x^2+y^2}$

19. If $f(x) = \log_a(\log_a x)$, then $f'(x)$ is

a) $\frac{\log_a e}{x \log_e x}$ b) $\frac{\log_e a}{x \log_a x}$

c) $\frac{\log_e a}{x}$ d) $\frac{x}{\log_e a}$

20. If $y = \log^n x$, where $\log^n$ means log log log…(repeated n times), then $x \log x \log^2 x \log^3 x \ldots \log^{n-1} x \log^n x \frac{dy}{dx}$ is equal to

a) $\log x$ b) $\log^n x$

c) $\frac{1}{\log x}$ d) 1

SESSION : 2025-26

DPP

DAILY PRACTICE PROBLEMS

CLASS : XIIth
SUBJECT : MATHS
DATE :
DPP NO. : 4

Topic :-DIFFERENTITATION

1. If $y = \sin px$ and y_n is the nth derivative of y, then $\begin{vmatrix} y & y_1 & y_2 \\ y_3 & y_4 & y_5 \\ y_6 & y_7 & y_8 \end{vmatrix}$ is equal to

a) 1 b) 0
c) -1 d) None of these

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

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

3. If $f(4) = 4, f'(4) = 1$, then $\lim_{x\to 4} \frac{2-\sqrt{f(x)}}{2-\sqrt{x}}$ is equal to

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

4. If $x = \frac{2at}{1+t^3}$ and $y = \frac{2at^2}{(1+t^3)^2}$, then $\frac{dy}{dx}$ is

a) ax b) a^2x^2
c) $\frac{x}{a}$ d) $\frac{x}{2a}$

5. $y = e^{a \sin^{-1} x} \Rightarrow (1 - x^2)y_{n+2} - (2n + 1)xy_{n+1}$ is equal to

a) $-(n^2 + a^2)\, y_n$ b) $(n^2 - a^2)y_n$ c) $(n^2 + a^2)y_n$ d) $-(n^2 - a^2)y_n$

6. If $\sec\left(\frac{x-y}{x+y}\right) = a$, then $\frac{dy}{dx}$ is

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

7. If $y = x + x^2 + x^3 \ldots \infty$, where $|x| < 1$, then for $|y| < 1, \frac{dx}{dy}$ is equal to

a) $y + y^2 + y^3 + \ldots \infty$
b) $1 - y + y^2 - y^3 + \ldots \infty$
c) $1 - 2y + 3y^2 - \ldots \infty$
d) $1 + 2y + 3y^2 + \ldots \infty$

8. $\frac{d}{dx}\sqrt{\frac{1-\sin 2x}{1+\sin 2x}}$ is equal to

a) $\sec^2 x$ b) $-\sec^2\left(\frac{\pi}{4} - x\right)$ c) $\sec^2\left(\frac{\pi}{4} + x\right)$ d) $\sec^2\left(\frac{\pi}{4} - x\right)$

9. Derivative of $\log_{10} x$ with respect to x^2 is

a) $2x^2 \log_e 10$ b) $\frac{\log_{10} e}{2x^2}$
c) $\frac{\log_e 10}{2x^2}$ d) $x^2 \log_e 10$

10. If $y = \text{In}\left(\frac{x}{a+bx}\right)^x$, then $x^3 \frac{d^2y}{dx^2}$ is equal to

a) $\left(\frac{dy}{dx} + x\right)^2$ b) $\left(\frac{dy}{dx} - y\right)^2$
c) $\left(x\frac{dy}{dx} + y\right)^2$ d) $\left(x\frac{dy}{dx} - y\right)^2$

11. If f be a polynomial, then the second derivative of $f(e^x)$ is

a) $f'(e^x)$

b) $f''(e^x)e^x + f'(e^x)$

c) $f''(e^x)e^{2x} + f''(e^x)$

d) $f''(e^x)e^{2x} + f'(e^x)e^x$

12. If $2x^2 - 3xy + y^2 + x + 2y - 8 = 0$, then $\frac{dy}{dx}$ is equal to

a) $\frac{3y-4x-1}{2y-3x+2}$ b) $\frac{3y+4x+1}{2y+3x+2}$

c) $\frac{3y-4x+1}{2y-3x-2}$ d) $\frac{3y-4x+1}{2y+3x+2}$

13. If $y = \sqrt{\sin x + \sqrt{\sin x + \sqrt{\sin x + \cdots \infty}}}$, then $(2y-1)\frac{dy}{dx}$ is equal to

a) $\sin x$ b) $-\cos x$

c) $\cos x$ d) $-\sin x$

14. If $2^x + 2^y = 2^{x+y}$, then the value of $\frac{dy}{dx}$ at $x = y = 1$, is

a) 0 b) -1

c) 1 d) 2

15. If $y = \sec(\tan^{-1} x)$, then $\frac{dy}{dx}$ is equal to

a) $\frac{x}{\sqrt{1+x^2}}$ b) $-\frac{x}{\sqrt{1+x^2}}$

c) $\frac{x}{\sqrt{1-x^2}}$ d) None of these

16. Let $f(x) = (x-7)^2(x-2)^7, x \in [2,7]$. The value of $\theta \in (2,7)$ such that $f'(\theta) = 0$ is equal to

a) $\frac{49}{4}$ b) $\frac{53}{9}$

c) $\frac{53}{7}$ d) $\frac{49}{9}$

17. If $x^2 + y^2 = t - \frac{1}{t}$ and $x^4 + y^4 = t^2 + \frac{1}{t^2}$, then $x^3 y \frac{dy}{dx}$ equals

a) 0 b) 1

c) -1 d) None of these

18. The value of $\frac{d}{dx}(|x-1| + |x-5|)$ at $x = 3$, is

a) -2 b) 0

c) 2 d) 4

19. If $\sin^{-1} x + \sin^{-1} y = \frac{\pi}{2}$, then $\frac{dy}{dx}$ is equal to

a) $\frac{x}{y}$ b) $-\frac{x}{y}$

c) $\frac{y}{x}$ d) $-\frac{y}{x}$

20. If $f(x) = \frac{1}{1-x}$, then the derivative of the composite function $f[f\{f(x)\}]$ is equal to

a) 0 b) $\frac{1}{2}$

c) 1 d) 2

SESSION : 2025-26

DPP

DAILY PRACTICE PROBLEMS

CLASS : XIIth
SUBJECT : MATHS
DATE :
DPP NO. : 5

Topic :-DIFFERENTITATION

1. If $x = \exp\left\{\tan^{-1}\left(\frac{y-x^2}{x^2}\right)\right\}$, then $\frac{dy}{dx}$ equals
   a) $2x[1+\tan(\log x)] + x\sec^2(\log x)$
   b) $x[1+\tan(\log x)] + \sec^2(\log x)$
   c) $2x[1+\tan(\log x)] + x^2\sec^2(\log x)$
   d) $2x[1+\tan(\log x)] + \sec^2(\log x)$

2. If $\sin y = x\sin(a+y)$, then $\frac{dy}{dx}$ is
   a) $\frac{\sin a}{\sin^2(a+y)}$ b) $\frac{\sin^2(a+y)}{\sin a}$
   c) $\sin a\sin^2(a+y)$ d) $\frac{\sin^2(a-y)}{\sin a}$

3. $f(x) = e^x\sin x$, then $f''(x)$ is equal to
   a) $e^{6x}\sin 6x$ b) $2e^x\cos x$
   c) $8e^x\sin x$ d) $8e^x\cos x$

4. If $f(x) = \cos x.\cos 2x.\cos 4x.\cos 8x.\cos 16x$, then the value of $f'\left(\frac{\pi}{4}\right)$ is
   a) 1 b) $\sqrt{2}$
   c) $\frac{1}{\sqrt{2}}$ d) 0

5. If $\sec^{-1}\left(\frac{1+x}{1-x}\right) = a$, then $\frac{dy}{dx}$ is
   a) $\frac{y-1}{x+1}$ b) $\frac{y+1}{x-1}$
   c) $\frac{x-1}{y-1}$ d) $\frac{x-1}{y+1}$

6. The derivative of $a^{\sec x}$ w. r. t. $a^{\tan x}(a > 0)$ is
   a) $\sec x\, a^{\sec x-\tan x}$ b) $\sin x\, a^{\tan x-\sec x}$
   c) $\sin x\, a^{\sec x-\tan x}$ d) $a^{\sec x-\tan x}$

7. If $x = a\left\{\cos\theta + \log\tan\left(\frac{\theta}{2}\right)\right\}$ and $y = a\sin\theta$, then $\frac{dy}{dx}$ is equal to
   a) $\cot\theta$ b) $\tan\theta$ c) $\sin\theta$ d) $\cos\theta$

8. If $\phi(x)$ is the inverse of the function $f(x)$ and $f'(x) = \frac{1}{1+x^5}$, then $\frac{d}{dx}\phi(x)$ is
   a) $\frac{1}{1+\{\phi(x)\}^5}$ b) $\frac{1}{1+\{f(x)\}^5}$
   c) $1+\{\phi(x)\}^5$ d) $1+f(x)$

9. If $f(x) = 3e^{x^2}$, then $f'(x) - 2x\,f(x) + \frac{1}{3}f(0) - f'(0)$ is equal to
   a) 0 b) 1
   c) $(7/3)e^{x^2}$ d) e^{x^2}

10. If $u = \log\left(\frac{x^2+y^2}{x+y}\right)$, then the value of $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$ is
    a) -1 b) 0
    c) 1 d) 2

11. If $F(x) = \frac{1}{x^2}\int_4^x (4t^2 - 2F'(t))\,dt$, then $F'(4)$ equals
    a) $\frac{32}{9}$ b) $\frac{64}{3}$
    c) $\frac{64}{9}$ d) $\frac{32}{3}$

12. If $y = \tan^{-1}\frac{\sqrt{1+x^2}-\sqrt{1-x^2}}{\sqrt{1+x^2}+\sqrt{1-x^2}}$, then $\frac{dy}{dx}$ is equal to
    a) $\frac{x^2}{\sqrt{1-x^4}}$ b) $\frac{x^2}{\sqrt{1+x^4}}$
    c) $\frac{x}{\sqrt{1+x^4}}$ d) $\frac{x}{\sqrt{1-x^4}}$

13. If $f(x) = |x^2 - 5x + 6|$, then $f'(x)$ equals
    a) $2x-5$ for $2 < x < 3$ b) $5-2x$ for $2 < x < 3$ c) $2x-5$ for $2 \leq$

$x \leq 3$ d) $5 - 2x$ for $2 \leq x \leq 3$

14. If $\sqrt{x+y} + \sqrt{y-x} = c$, then $\frac{d^2y}{dx^2}$ equals
    a) $2/c$ b) $-2/c^2$ c) $2/c^2$ d) $-2/c$

15. Derivative of $x^6 + 6^x$ with respect to x is
    a) $12x$ b) $x + 4$ c) $6x^5 + 6^x \log 6$ d) $6x^5 + x6^{x-1}$

16. If $f(x) = \cos^2 x + \cos^2\left(x + \frac{\pi}{3}\right) + \sin x \sin\left(x + \frac{\pi}{3}\right)$ and $g\left(\frac{5}{4}\right) = 3$, then $\frac{d}{dx}\left(gof(x)\right) =$
    a) 1 b) 0
    c) -1 d) None of these

17. If $y = \sin^{-1}\frac{x}{2} + \cos^{-1}\frac{x}{2}$, then the value of $\frac{dy}{dx}$ is
    a) 1 b) -1
    c) 0 d) 2

18. If $z = y + f(v)$, where $v = \left(\frac{x}{y}\right)$, then $v\frac{\partial z}{\partial x} + \frac{\partial z}{\partial y}$ is
    a) -1 b) 1
    c) 0 d) 2

19. If $y = \tan^{-1}\left(\frac{\sqrt{x}-x}{1+x^{3/2}}\right)$, then $y'(1)$ is equal to
    a) 0 b) $\frac{1}{2}$
    c) -1 d) $-\frac{1}{4}$

20. If $f(1) = 1$ and $f'(1) = 2$, then $\lim_{x\to 1}\frac{\sqrt{f(x)}-1}{\sqrt{x}-1}$ equals
    a) 2 b) 4
    c) 1 d) ½

SESSION : 2025-26

DPP

DAILY PRACTICE PROBLEMS

CLASS : XIIth
SUBJECT : MATHS
DATE :
DPP NO. : 6

Topic :-DIFFERENTITATION

1. The derivative of $\cos^3 x$ w.r.t. $\sin^3 x$ is
   a) $-\cot x$ b) $\cot x$
   c) $\tan x$ d) $-\tan x$

2. If $y = \log\left\{\left(\frac{1+x}{1-x}\right)^{1/4}\right\} - \frac{1}{2}\tan^{-1} x$, then $\frac{dy}{dx} =$
   a) $\frac{x}{1-x^2}$ b) $\frac{x^2}{1-x^4}$
   c) $\frac{x}{1+x^4}$ d) $\frac{x}{1-x^4}$

3. If $y = \left(x + \sqrt{1+x^2}\right)^n$, then $(1 + x^2)\frac{d^2y}{dx^2} + x\frac{dy}{dx}$ is
   a) $n^2 y$ b) $-n^2 y$
   c) $-y$ d) $2x^2 y$

4. The value of $\frac{d}{dx}\left[\tan^{-1}\left(\frac{\sqrt{x}(3-x)}{1-3x}\right)\right]$ is
   a) $\frac{1}{2(1+x)\sqrt{x}}$ b) $\frac{3}{(1+x)\sqrt{x}}$
   c) $\frac{2}{(1+x)\sqrt{x}}$ d) $\frac{3}{2(1+x)\sqrt{x}}$

5. If $y = \tan^{-1}\left[\frac{\sin x + \cos x}{\cos x - \sin x}\right]$, then $\frac{dy}{dx}$ is equal to
   a) $\frac{1}{2}$ b) $\frac{\pi}{4}$
   c) 0 d) 1

6. $x = \cos\theta, y = \sin 5\theta \Rightarrow (1 - x^2)\frac{d^2y}{dx^2} - x\frac{dy}{dx}$ is
   a) $-5y$ b) $5y$
   c) $25y$ d) $-25y$

7. If the function $f(x)$ is defined by $f(x) = a + bx$ and $f^r = fff$ ...(repeated r times), then $f^r(x)$ is equal to
   a) $a + b^r x$ b) $ar + b^r x$ c) $ar + bx^r$ d) $a\left(\frac{b^r - 1}{b-1}\right) + b^r x$

8. If $x^y = e^{x-y}$, then $\frac{dy}{dx}$ is equal to
   a) $(1 + \log x)^{-1}$ b) $(1 + \log x)^{-2}$ c) $\log x \cdot (1 + \log x)^{-2}$ d) None of these

9. The derivative of $\sin^2 x$ with respect to $\cos^2 x$ is
   a) $\tan^2 x$ b) $\tan x$
   c) $-\tan x$ d) None of these

10. If $x^p y^q = (x + y)^{p+q}$, then $\frac{dy}{dx}$ is equal to
    a) $\frac{y}{x}$ b) $\frac{py}{qx}$
    c) $\frac{x}{y}$ d) $\frac{qy}{px}$

11. If $y = (1 + x^2)\tan^{-1} x - x$, then $\frac{dy}{dx}$ is equal to
    a) $\tan^{-1} x$ b) $2x\tan^{-1} x$
    c) $2x\tan^{-1} x - 1$ d) $\frac{2x}{\tan^{-1} x}$

12. The derivative of $\sin^{-1}\left(\frac{\sqrt{1+x} + \sqrt{1-x}}{2}\right)$ with respect to x is
    a) $-\frac{1}{2\sqrt{1-x^2}}$ b) $\frac{1}{2\sqrt{1-x^2}}$
    c) $\frac{2}{\sqrt{1-x^2}}$ d) $\frac{-2}{\sqrt{1-x^2}}$

13. The derivative of $\tan^{-1}\left(\frac{\sqrt{1+x} - \sqrt{1-x}}{\sqrt{1+x} + \sqrt{1-x}}\right)$ is
    a) $\sqrt{1-x^2}$ b) $\frac{1}{\sqrt{1-x^2}}$
    c) $\frac{1}{2\sqrt{1-x^2}}$ d) x

14. If $y = \tan^{-1} x + \cot^{-1} x + \sec^{-1} + \text{cosec}^{-1} x$, then $\frac{dy}{dx}$ is equal to

a) $\frac{x^2-1}{x^2+1}$ b) π

c) 0 d) 1

15. If $y = \left(\frac{ax+b}{cx+d}\right)$, then $2\frac{dy}{dx}.\frac{d^3y}{dx^3}$ is equal to

a) $\left(\frac{d^2y}{dx^2}\right)^2$ b) $3\frac{d^2y}{dx^2}$

c) $3\left(\frac{d^2y}{dx^2}\right)^2$ d) $3\frac{d^2x}{dy^2}$

16. If $y = (\log_{\cos x} \sin x)(\log_{\sin x} \cos x) + \sin^{-1}\frac{2x}{1+x^2}$, then $\frac{dy}{dx}$ at $x = \frac{\pi}{2}$ is equal to

a) $\frac{8}{(4+\pi^2)}$ b) 0

c) $-\frac{8}{(4+\pi^2)}$ d) None of the above

17. If $y = \tan^{-1}\left(\frac{a\cos x - b\sin x}{b\cos x + a\sin x}\right)$, then $\frac{dy}{dx}$ is equal to

a) 2 b) -1

c) $\frac{a}{b}$ d) 0

18. If $x = \cos\theta$, $y = \sin 5\theta$, then $(1 - x^2)\frac{d^2y}{dx^2} - x\frac{dy}{dx} =$

a) $-5y$ b) $5y$

c) $25y$ d) $-25y$

19. The differential coefficient of $\tan^{-1}\left(\frac{\sqrt{1+x}-\sqrt{1-x}}{\sqrt{1+x}+\sqrt{1-x}}\right)$ is

a) $\sqrt{1-x^2}$ b) $\frac{1}{\sqrt{1-x^2}}$

c) $\frac{1}{2\sqrt{1-x^2}}$ d) x

20. If $f(x) = (x-2)(x-4)(x-6)\ldots(x-2n)$, then $f'(2)$ is

a) $(-1)^n 2^{n-1}(n-1)!$ b) $(-2)^{n-1}(n-1)!$ c) $(-2)^n n!$ d) $(-1)^{n-1}2^n(n-1)!$

SESSION : 2025-26

DPP

DAILY PRACTICE PROBLEMS

CLASS : XIIth
SUBJECT : MATHS
DATE :
DPP NO. : 7

Topic :-DIFFERENTITATION

1. Find $\frac{dy}{dx}$, if $x = 2\cos\theta - \cos 2\theta$ and $y = 2\sin\theta - \sin 2\theta$.

a) $\tan\frac{3\theta}{2}$ b) $-\tan\frac{3\theta}{2}$
c) $\cot\frac{3\theta}{2}$ d) $-\cot\frac{3\theta}{2}$

2. Let $f(x) = 2^{2x-1}$ and $\phi(x) - 2^x + 2x\log 2$. If $f'(x) > \phi'(x)$, then

a) $0 < x < 1$ b) $0 \le x < 1$ c) $x > 0$ d) $x \ge 0$

3. If $x\sqrt{1+y} + y\sqrt{1+x} = 0$, then $\frac{dy}{dx} =$

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

4. If $y = e^{(1/2)\log(1+\tan^2 x)}$, then $\frac{dy}{dx}$ is equal to

a) $\frac{1}{2}\sec^2 x$
b) $\sec^2 x$
c) $\sec x \tan x$
d) $e^{1/2\log(1+\tan^2 x)}$

5. If $f(x) = \frac{x-1}{4} + \frac{(x-1)^3}{12} + \frac{(x-1)^5}{20} + \frac{(x-1)^7}{28} + \cdots$, where $0 < x < 2$, then $f'(x)$ is equal to

a) $\frac{1}{4x(2-x)}$ b) $\frac{1}{4(x-2)^2}$
c) $\frac{1}{2-x}$ d) $\frac{1}{2+x}$

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

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

7. If $f(x) = \arctan\left(\frac{x^x - x^{-x}}{2}\right)$, then $f'(1)$ is equal to

a) 1 b) -1
c) $\log 2$ d) None of these

8. If for all $x, y \in R$, the function f is defined by $f(x) + f(y) + f(x)f(y) = 1$ and $f(x) > 0$. Then,

a) $f'(x) = 0$ for all $x \in R$
b) $f'(0) < f'(1)$
c) $f'(x)$ does not exist
d) None of these

9. Let $f(x) = e^x$, $g(x) = \sin^{-1} x$ and $h(x) = f[g(x)]$, then $\frac{h'(x)}{h(x)}$ is equal to

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

10. If $f(x,y) = \frac{\cos(x-4y)}{\cos(x+4y)}$, then $\left.\frac{\partial f}{\partial x}\right|_{y=\frac{\pi}{2}}$ is equal to

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

11. If $y = \sin^n x \cos nx$, then $\frac{dy}{dx}$ is

a) $n \sin^{n-1} x \sin(n + 1) x$ b) $n \sin^{n-1} x \cos(n-1) x$

c) $n \sin^{n-1} x \cos nx$

d) $n \sin^{n-1} x \cos(n+1) x$

12. If $2f(x) = f'(x)$ and $f(0) = 3$, then $f(2)$ is equal to

a) $3e^4$ b) $3e^2$

c) e^4 d) None of these

13. If $y^2 = P(x)$ is a polynomial of degree 3, then $2\frac{d}{dx}\left[y^3 \frac{d^2y}{dx^2}\right]$ equals

a) $P'''(x) + P'x$ b) $P''(x).P'''(x)$ c) $P(x).P'''(x)$

d) None of these

14. If $e^{y+e^{y+\cdots\infty}}, x > 0$, then $\frac{dy}{dx}$ is

a) $\frac{x}{1+x}$ b) $\frac{1}{x}$

c) $\frac{1-x}{x}$ d) $\frac{1+x}{x}$

15. The 2nd derivative of $a \sin^3 t$ with respect to $a \cos^3 t$ at $t = \frac{\pi}{4}$ is

a) $\frac{4\sqrt{2}}{3a}$ b) 2

c) $\frac{1}{12a}$ d) None of these

16. The derivative of $\sin(x^3)$ w.r.t.$\cos(x^3)$ is

a) $-\tan(x^3)$ b) $\tan(x^3)$

c) $-\cot(x^3)$ d) $\cot(x^3)$

17. If $y = \tan^{-1}\left(\frac{\cos x}{1+\sin x}\right)$, then $\frac{dy}{dx}$ is equal to

a) $\frac{1}{2}$ b) 2

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

18. If $y = \tan^{-1}\sqrt{\frac{1-\sin x}{1+\sin x}}$, then the value of $\frac{dy}{dx}$ at $x = \frac{\pi}{6}$ is

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

c) 1 d) -1

19. If $y = \log_{\cos x} \sin x$, then $\frac{dy}{dx}$ is equal to

a) $\frac{(\cot x \log\cos x + \tan x \log\sin x)}{(\log\cos x)^2}$

b) $\frac{(\tan x \log\cos x + \cot x \log\sin x)}{(\log\cos x)^2}$

c) $\frac{(\cot x \log\cos x + \tan x \log\sin x)}{(\log\sin x)^2}$

d) None of the above

20. If $y = 2^x.3^{2x-1}$, then $\frac{d^2y}{dx^2}$ is equal to

a) $(\log 2)(\log 3)$ b) $(\log 18)$ c) $(\log 18^2)\, y^2$ d) $(\log 18)^2\, y$

SESSION : 2025-26

DPP

DAILY PRACTICE PROBLEMS

CLASS : XIIth
SUBJECT : MATHS
DATE :
DPP NO. : 8

Topic :-DIFFERENTITATION

1. If $y = \sec^{-1}\frac{x+1}{x-1} + \sin^{-1}\frac{x-1}{x+1}$, then $\frac{dy}{dx}$ is
   a) 1 b) 0
   c) $\frac{x-1}{x+1}$ d) $\frac{x+1}{x-1}$

2. Let $g(x) = \log f(x)$, where $f(x)$ is a twice differentiable positive function on $(0,\infty)$ such that $f(x+1) = xf(x)$. Then, for $N = 1,2,3,\ldots$, $g''\left(N+\frac{1}{2}\right) - g''\left(\frac{1}{2}\right)$ is equal to
   a) $-4\left\{1+\frac{1}{9}+\frac{1}{25}+\cdots+\frac{1}{(2N-1)^2}\right\}$
   b) $4\left\{1+\frac{1}{9}+\frac{1}{25}+\cdots+\frac{1}{(2N-1)^2}\right\}$
   c) $-4\left\{1+\frac{1}{9}+\frac{1}{25}+\cdots+\frac{1}{(2N+1)^2}\right\}$
   d) $4\left\{1+\frac{1}{9}+\frac{1}{25}+\cdots+\frac{1}{(2N+1)^2}\right\}$

3. If $y = \log_{x^2+4}(7x^2-5x+1)$, then $\frac{dy}{dx}$ is equal to
   a) $\log_e(x^2+4)\cdot\left\{\frac{14x-5}{7x^2-5x+1} - \frac{2xy}{x^2+4}\right\}$
   b) $\frac{1}{\log_e(x^2+4)}\left\{\frac{14x-5}{7x^2-5x+1} - \frac{2xy}{x^2+4}\right\}$
   c) $\log_e(7x^2-5x+1)\left\{\frac{2x}{x^2+4} - \frac{(14x-5)y}{7x^2-5x+1}\right\}$
   d) $\frac{1}{\log_e(7x^2-5x+1)}\left\{\frac{2x}{x^2+4} - \frac{(14x-5)y}{7x^2-5x+1}\right\}$

4. If $\sin y = e^{-x\cos y} = e$, then $\frac{dy}{dx}at\ (1,\pi)$ is equal to
   a) $\sin y$ b) $-x\cos y$
   c) e d) $\sin y - x\cos y$

5. If $y = \tan^{-1}\left(\frac{\sqrt{1+x^2}-1}{x}\right)$, then $y'(0)$ is
   a) $\frac{1}{2}$ b) 0
   c) 1 d) -1

6. Differential coefficient of $\sqrt{\sec\sqrt{x}}$ is
   a) $\frac{1}{4\sqrt{x}}\sec\sqrt{x}\sin\sqrt{x}$
   b) $\frac{1}{4\sqrt{x}}\left(\sec\sqrt{x}\right)^{3/2}.\sin\sqrt{x}$
   c) $\frac{1}{2}\sqrt{x}\sec\sqrt{x}\sin\sqrt{x}$
   d) $\frac{1}{2}\sqrt{x}\left(\sec\sqrt{x}\right)^{3/2}.\sin\sqrt{x}$

7. If $f(x) = \sin x$ and $g(x) = sgn\sin x$, then $g'(1)$ equals
   a) 0 b) $-\cos 1$
   c) $\cos 1$ d) None of these

8. The derivative of $y = x^{\ln x}$ is
   a) $x^{\ln x}\ln x$ b) $x^{\ln x-1}\ln$
   x c) $2x^{\ln x-1}\ln x$ d) $x^{\ln x-2}$

9. If $x = e^t\sin t, y = e^t\cos t$, then $\frac{d^2y}{dx^2}$ at $x = \pi$ is
   a) $2e^{\pi}$ b) $\frac{1}{2}e^{\pi}$
   c) $\frac{1}{2e^{\pi}}$ d) $\frac{2}{e^{\pi}}$

10. If $f'(x) = \sin(\log x)$ and $y = f\left(\frac{2x+3}{3-2x}\right)$, then $\frac{dy}{dx}$ equals

a) $\sin(\log x) \cdot \frac{1}{x \log x}$

b) $\frac{12}{(3-2x)^2} \sin\left\{\log\left(\frac{2x+3}{3-2x}\right)\right\}$

c) $\sin\left\{\log\left(\frac{2x+3}{3-2x}\right)\right\}$

d) None of these

11. If $r = [2\phi + \cos^2(2\phi + \pi/4)]^{1/2}$, then what is the value of the derivative of $dr/d\phi$ at $\phi = \pi/4$?

a) $2\left(\frac{1}{\pi+1}\right)^{1/2}$ b) $2\left(\frac{2}{\pi+1}\right)^{2}$

c) $\left(\frac{2}{\pi+1}\right)^{1/2}$ d) $2\left(\frac{2}{\pi+1}\right)^{1/2}$

12. For $|x| < 1$, let $y = 1 + x + x^2$ ...to ∞, then $\frac{dy}{dx}$ equal to

a) $\frac{x}{y}$ b) $\frac{x^2}{y^2}$

c) $\frac{x}{y^2}$ d) $xy^2 + y$

13. If $f(x+y) = 2f(x)f(y)$, $f'(5) = 1024(\log 2)$ and $f(2) = 8$, then the value of $f'(3)$ is

a) 64 (log 2)b) 128 (log 2)c) 256d) 256 (log 2)

14. The value of differentiation of e^{x^2} with respect to e^{2x-1} at $x = 1$ is

a) e b) 0

c) e^{-1} d) 1

15. Let $x = \log_e t, t > 0$ and $y + 1 = t^2$. Then, $\frac{d^2x}{dy^2}$ is equal to

a) $4e^{2x}$ b) $-\frac{1}{2}e^{-4x}$

c) $-\frac{3}{4}e^{5x}$ d) $4e^{x}$

16. If $y = \cot^{-1}(\cos 2x)^{1/2}$, then the value of $\frac{dy}{dx}$ at $x = \frac{\pi}{6}$ will be

a) $\left(\frac{2}{3}\right)^{1/2}$ b) $\left(\frac{1}{3}\right)^{1/2}$

c) $(3)^{1/2}$ d) $(6)^{1/2}$

17. If $P(x)$ is a polynomial such that $P(x^2 + 1) = \{P(x)\}^2 + 1$ and $P(0) = 0$, then $P'(0)$ is equal to

a) -1 b) 0

c) 1 d) None of these

18. If $y = (\cos x^2)^2$, then $\frac{dy}{dx}$ is equal to

a) $-4x \sin 2x^2$ b) $-x \sin x^2$

c) $-2x \sin 2x^2$ d) $-x \cos 2x^2$

19. Let $f(x) = 2^{2x-1}$ and $g(x) = -2^x + 2x \log 2$. Then the set of points satisfying $f'(x) > g'(x)$, is

a) (0, 1) b) [0,

1) c) $(0, \infty)$ d) $[0, \infty)$

20. $\frac{d}{dx}\left\{\tan^{-1}\left(\frac{2x}{1-x^2}\right) + \tan^{-1}\left(\frac{3x-x^3}{1-3x^2}\right) - \tan^{-1}\left(\frac{4x-4x^3}{1-6x^2+x^4}\right)\right\}$ is equal to

a) $\frac{1}{\sqrt{1-x^2}}$ b) $-\frac{1}{\sqrt{1-x^2}}$

c) $\frac{1}{1+x^2}$ d) $-\frac{1}{1+x^2}$

SESSION : 2025-26

DPP

DAILY PRACTICE PROBLEMS

CLASS : XIIth
SUBJECT : MATHS
DATE :
DPP NO. : 9

Topic :-DIFFERENTITATION

1. If $y = \frac{\sqrt{1-\sin x}+\sqrt{1+\sin x}}{\sqrt{1-\sin x}-\sqrt{1+\sin x}}$, then $\frac{dy}{dx}$ is equal to
   a) $\frac{1}{2}\text{cosec}^2\frac{x}{2}$ b) $\frac{1}{2}\text{cosec}\frac{x}{2}$
   c) $\frac{1}{2}\text{cosec}^2 x$ d) $\text{cosec}^2\frac{x}{2}$

2. The value of $\frac{dy}{dx}$ at $x = \frac{\pi}{2}$, where y is given by $y = x^{\sin x} + \sqrt{x}$, is
   a) $1 + \frac{1}{\sqrt{2\pi}}$ b) 1 c) $\frac{1}{\sqrt{2\pi}}$
   d) $1 - \frac{1}{\sqrt{2\pi}}$

3. If $y = \frac{3at^2}{1+t^3}$, $x = \frac{3at}{1+t^3}$, then $\frac{dy}{dx}$ is equal to
   a) $\frac{t(2-t^3)}{(1-2t^3)}$ b) $\frac{t(2+t^3)}{(1-2t^3)}$
   c) $\frac{t(2-t^3)}{(1+2t^3)}$ d) $\frac{t(2+t^3)}{(1+2t^3)}$

4. If $y = \log_a x + \log_x a + \log_x x + \log_a a$, then $\frac{dy}{dx}$ is equal to
   a) $\frac{1}{x} + x\log a$ b) $\frac{\log a}{x} + \frac{x}{\log a}$ c) $\frac{1}{x\log a} + x\log a$ d) None of these

5. If $8f(x) + 6f\left(\frac{1}{x}\right) = x + 5$ and $y = x^2 f(x)$, then the value of $\frac{dy}{dx}$ at $x = -1$, is
   a) 0 b) $\frac{1}{14}$
   c) $-\frac{1}{14}$ d) $\frac{1}{7}$

6. If $y = \sqrt{\frac{1-x}{1+x}}$, then $(1-x^2)\frac{dy}{dx} + y$ is equal to
   a) 1 b) -1
   c) 2 d) 0

7. If $x^y = e^{2(x-y)}$, then $\frac{dy}{dx}$ is equal to
   a) $\frac{2(1+\log x)}{(2+\log x)^2}$ b) $\frac{1+\log x}{(2+\log x)^2}$
   c) $\frac{2}{2+\log x}$ d) $\frac{2(1-\log x)}{(2+\log x)^2}$

8. If $x = a(1+\cos\theta)$, $y = a(\theta + \sin\theta)$, then $\frac{d^2y}{dx^2}$ at $\theta = \frac{\pi}{2}$ is
   a) $-\frac{1}{a}$ b) $\frac{1}{a}$
   c) -1 d) -2

9. If $y^2 = ax^2 + bx + c$, where a, b, c are constants, then $y^3\frac{d^2y}{dx^2}$ is equal to
   a) a constant
   b) a function of x
   c) a function of y
   d) a function of x and y both

10. If $y = 1 + \frac{1}{x} + \frac{1}{x^2} + \frac{1}{x^3} + \cdots \infty$ with $|x| > 1$, then $\frac{dy}{dx}$ is
   a) $\frac{x^2}{y^2}$ b) x^2y^2
   c) $\frac{y^2}{x^2}$ d) $-\frac{y^2}{x^2}$

11. If $f(x,y) = 2(x-y)^2 - x^4 - y^4$, then $\left|(f_{xx}f_{yy} - f_{xy}^2)\right|_{0,0}$ is

a) 32 b) 16
c) 0 d) -1

12. If $y = \left[\tan^{-1}\frac{1}{1+x+x^2} + \tan^{-1}\frac{1}{x^2+3x+3} + \tan^{-1}\frac{1}{x^2+5x+7} + \ldots + \text{upto } n \text{ terms } \right]$, then $y'(0)$is equal to

a) $\frac{-1}{(n^2+1)}$ b) $\frac{-n^2}{(n^2+1)}$
c) $\frac{n^2}{(n^2+1)}$ d) None of these

13. Given that $\frac{d}{dx}f(x) = f'(x)$. The relationship $f'(a+b) = f'(a) + f'(b)$ is valid, if $f(x)$ is equal to

a) x b) x^2
c) x^3 d) x^4

14. nth derivative of $(x+1)^n$ is equal to

a) $(n-1)!$ b) $(n+1)!$ c) $n!$ d) $n[(n+1)]^{n-1}$

15. If $y = 2^x.3^{2x-1}$, then$\frac{dy}{dx}$ is equal to

a) $(\log 2)(\log 3)$ b) $(\log 18)$
c) $(\log 18^2)y^2$ d) $(\log 18)y$

16. If $y = x^2 + \frac{1}{x^2+\frac{1}{x^2+\frac{1}{x^2+\cdots\infty}}}$, then $\frac{dy}{dx}$is equal to

a) $\frac{2xy}{2y-x^2}$ b) $\frac{xy}{y+x^2}$
c) $\frac{xy}{y-x^2}$ d) $\frac{2x}{2+\frac{x^2}{y}}$

17. If $y = \frac{e^x+e^{-x}}{e^x-e^{-x}}$, then $\frac{dy}{dx}$ is equal to

a) $\text{sech}^2 x$ b) $\text{cosech}^2 x$
c) $-\text{sech}^2 x$ d) $-\text{cosech}^2 x$

18. If $f(x) = |x-2|$and$g(x) = f\big(f(x)\big)$, then for $x > 20$, $g'(x)$ is equal to

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

19. If $5f(x) + 3f\left(\frac{1}{x}\right) = x+2$ and $y = x\,f(x)$, then $\left(\frac{dy}{dx}\right)_{x=1}$ is equal to

a) 14 b) 7/8
c) 1 d) None of these

20. The differential coefficient of $f(\log x)$, where $f(x) = \log x$ is

a) $\frac{x}{\log x}$ b) $(x\log x)^{-1}$
c) $\frac{\log x}{x}$ d) None of these

SESSION : 2025-26

DPP

DAILY PRACTICE PROBLEMS

CLASS : XIIth
SUBJECT : MATHS
DATE :
DPP NO. : 10

Topic :-DIFFERENTITATION

1. Let $f(x) = \frac{x^2}{1-x^2}, x \neq 0, \pm 1$, then derivative of $f(x)$ with respect to x is
   a) $\frac{2x}{(1-x^2)^2}$ 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 $f'\big(f(x)\big)$ 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 $\frac{d^2y}{dx^2}$ 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) In 10 $(\tan x + x\sec^2 x)$
   c) In 10 $\left(\tan x + \frac{x}{\cos^2 x} + \tan x \sec x\right)$
   d) $x \tan x$ In 10

9. If $y = 1 - x + \frac{x^2}{2!} - \frac{x^3}{3!} + \frac{x^4}{4!} - \cdots$, then $\frac{d^2y}{dx^2}$ 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) $\frac{1}{2}\left\{5^n \sin\left(5x + \frac{n\pi}{2}\right) + \sin\left(x + \frac{\pi}{2}\right)\right\}$
    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 $fx) = \sin x, g(x) = x^2$ and $h(x) = \log_e x$. If $F(x) = (hogof)(x)$, then $F''(x)$ is equal to

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

d) $-2\ \text{cosec}^2 x$

14. $x = \cos^{-1}\left(\frac{1}{\sqrt{1+t^2}}\right),\ y = \sin^{-1}(\frac{t}{\sqrt{1+t^2}}) \Rightarrow \frac{dy}{dx}$ 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 $f'\left(\sqrt[5]{\frac{\pi}{2}}\right)$ 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) $\frac{1}{(1+e^x)^2}$