QB365 Question Bank Software Study Materials

Differential Calculus - Differentiability and Methods of Differentiation 50 Important 1 Marks Questions With Answers (Book Back and Creative)

11th Standard

Maths

Total Marks : 50

Multiple Choice Question

50 x 1 = 50

1) $\frac{d}{dx}\left(\frac{2}{\pi}\sin x^{\circ}\right)$ is

(a) $\frac{\pi}{180}cos\ x^{o}$ **(b)** $\frac{1}{90}cos\ x^{o}$ (c) $\frac{\pi}{90}cos\ x^{o}$ (d) $\frac{2}{\pi}cos\ x^{o}$

2) If y = f(x^2+2) and f '(3) = 5, then $\frac{dy}{dx}$ at x = 1 is

(a) 5 (b) 25 (c) 15 **(d) 10**

3) If y = $\frac{1}{4}u^4, u = \frac{2}{3}x^3 + 5$, then $\frac{dy}{dx}$ is

(a) $\frac{1}{27}x^2(2x^3+15)^3$ (b) $\frac{2}{27}x(2x^3+5)^3$ **(c)** $\frac{2}{27}x^2(2x^3+15)^3$ (d) $-\frac{2}{27}x(2x^3+5)^3$

4) If f(x) = x^2 - 3x, then the points at which f(x) = f '(x) are

(a) both positive integers (b) both negative integers **(c) both irrational** (d) one rational and another irrational

5) If $y = \frac{1}{a-z}$, then $\frac{dz}{dy}$ is

(a) $(a-z)^2$ (b) -(z - a)^2 (c) (z + a)^2 (d) -(z + a)^2

6) If y = cos (sin x^2), then $\frac{dy}{dx}$ at x = $\sqrt{\frac{\pi}{2}}$ is

(a) -2 (b) 2 (c) $-2\sqrt{\frac{\pi}{2}}$ **(d) 0**

7) If y = mx + c and f(0) = $f'(0) = 1$, then f(2) is

(a) 1 (b) 2 **(c) 3** (d) -3

8) If f(x) = x $\tan^{-1}$ x, then f '(1) is

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

9) $\frac{d}{dx}\left(e^{x+5log\ x}\right)$ is

(a) $e^x.x^4(x+5)$ (b) e^x.x(x+5) (c) $e^x+\frac{5}{x}$ (d) $e^x-\frac{5}{x}$

10) If the derivative of (ax - 5)e^{3x} at x = 0 is -13, then the value of a is

(a) 8 (b) -2 (c) 5 **(d) 2**

11) $x = \frac{1-t^2}{1+t^2}, y = \frac{2t}{1+t^2}$ then $\frac{dy}{dx}$is

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

12) If x = a sin θ and y = b cos θ, then $\frac{d^2y}{dx^2}$is

(a) $\frac{a}{b^2}sec^2\theta$ (b) $-\frac{b}{a}sec^2\theta$ **(c)** $-\frac{b}{a^2}sec^3\theta$ (d) $-\frac{b^2}{a^2}sec^3\theta$

13) The differential coefficient of $\log_{10}$ x with respect to $\log_x$10 is

(a) 1 **(b) -($\log_{10}$ x)^2** (c) ($\log_x$ 10)^2 (d) $\frac{x^2}{100}$

14) If f(x) = x + 2, then f '(f(x)) at x = 4 is

(a) 8 **(b) 1** (c) 4 (d) 5

15) If $y = \frac{(1-x)^2}{x^2}$, then $\frac{dy}{dx}$ is

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

16) If pv = 81, then $\frac{dp}{dv}$ at v = 9 is

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

17) If $f(x) = \begin{cases} x - 5 & \text{if } x \leq 1 \\ 4x^2 - 9 & \text{if } 1 < x < 2 \\ 3x + 4 & \text{if } x \geq 2 \end{cases}$, then the right hand derivative of f(x) at x = 2 is

(a) 0 (b) 2 **(c) 3** (d) 4

18) It is given that f '(a) exists, then $lim_{x \to a} \frac{xf(a) - af(x)}{x - a}$ is

(a) f(a) - af '(a) (b) f '(a) (c) - f '(a) (d) f(a) + af '(a)

19) If $f(x) = \begin{cases} x + 1, & \text{when } x < 2 \\ 2x - 1 & \text{when } x \geq 2 \end{cases}$, then f'(2) is

(a) 0 (b) 1 (c) 2 **(d) does not exist**

20) If g(x) = (x^2 + 2x + 3) f(x) and f(0) = 5 and $lim_{x \to 0} \frac{f(x) - 5}{x} = 4$, then g'(0) is

(a) 20 **(b) 14** (c) 18 (d) 12

21) If f(x) = $\begin{cases} x + 2 & -1 < x < 3 \\ 5, & x = 3 \\ 8 - x, & x > 3 \end{cases}$, then at x = 3, f'(x) is:

(a) 1 (b) -1 (c) 0 **(d) does not exist**

22) The derivative of f(x) = x |x| at x = −3 is

(a) 6 (b) -6 (c) does not exist (d) 0

23) If $f(x) = \begin{cases} 2a - x, & \text{for } -a < x < a \\ 3x - 2a & \text{for } x \geq a \end{cases}$, then which one of the following is true?

(a) f(x) is not differentiable at x = a (b) f(x) is discontinuous at x = a (c) f(x) is continuous for all x in **R**

(d) f(x) is differentiable for all x $\geq$ a

24) If $f(x) = \begin{cases} ax^2 - b, & -1 < x < 1 \\ \frac{1}{|x|}, & \text{elsewhere} \end{cases}$ is differentiable at $x = 1$, then

(a) $a = \frac{1}{2}, b = \frac{-3}{2}$ (b) $a = \frac{-1}{2}, b = \frac{3}{2}$ **(c)** $a = -\frac{1}{2}, b = -\frac{3}{2}$ (d) $a = \frac{1}{2}, b = \frac{3}{2}$

25) The number of points in **R** in which the function $f(x) = |x - 1| + |x - 3| + sin\ x$ is not differentiable, is

(a) 3 **(b) 2** (c) 1 (d) 4

26) Choose the correct or the most suitable answer from the given four alternatives.

If f(x) = $4x^8$, then _____

(a) $f'\left(\frac{1}{2}\right) = f'\left(\frac{-1}{2}\right)$ (b) $f\left(\frac{1}{2}\right) = -f'\left(\frac{-1}{2}\right)$ **(c)** $f\left(\frac{1}{2}\right) = f\left(\frac{-1}{2}\right)$ (d) $f\left(\frac{1}{2}\right) = f'\left(\frac{-1}{2}\right)$

27) Choose the correct or the most suitable answer from the given four alternatives.

If $y = \sin^{-1} x + \cos^{-1} x$ then $\frac{dy}{dx}$ is _____

(a) 1 (b) π (c) $\frac{\pi}{2}$ **(d) 0**

28) Choose the correct or the most suitable answer from the given four alternatives.

If $y = \log_a x$ then $\frac{dy}{dx}$ is _____

(a) $\frac{1}{x}$ **(b)** $\frac{1}{x \log_e a}$ (c) $\log \frac{a}{e}$ (d) $\frac{1}{\log_a x}$

29) Choose the correct or the most suitable answer from the given four alternatives.

If $f(x) = x + 1$, then $\frac{d}{dx}(f_0 f(x))$ is _____

(a) 1 (b) 0 (c) 2 (d) x

30) Choose the correct or the most suitable answer from the given four alternatives.

$If \sin(x + y) = \log(x + y)$ then $\frac{dy}{dx}$ is _____

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

31) Choose the correct or the most suitable answer from the given four alternatives.

For the curve $\sqrt{x} + \sqrt{y} = 1$, $\frac{dy}{dx} at \left(\frac{1}{4}, \frac{1}{4}\right) is$ _____

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

32) Choose the correct or the most suitable answer from the given four alternatives.

The derivative of $\cos^{-1}(2x^2 - 1)$ with respect to $\cos^{-1} x$ is _____

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

33) Choose the correct or the most suitable answer from the given four alternatives.

If $y = \log\left(\frac{1-x^2}{1+x^2}\right)$ then $\frac{dy}{dx}$ is _____

(a) $\frac{4x^3}{1-x^4}$ **(b)** $-\frac{4x}{1-x^4}$ (c) $\frac{1}{4-x^4}$ (d) $\frac{-4x^3}{1-x^4}$

34) Choose the correct or the most suitable answer from the given four alternatives.

The derivative of $\sin x$ with respect to $\cos x$is _____

(a) $\tan x$ (b) $\cot x$ (c) $-\tan x$ **(d)** $-\cot x$

35) Choose the correct or the most suitable answer from the given four alternatives.

If $y = \sin^{-1}\left(\frac{1-x^2}{1+x^2}\right)$ then $\frac{dy}{dx}$ is _____

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

36) Choose the correct or the most suitable answer from the given four alternatives.

If $x = a(\theta + \sin\theta), y = a(1 + \cos\theta)$ then $\frac{dy}{dx}$ is _____

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

37) Choose the correct or the most suitable answer from the given four alternatives.

If, $y = a + bx^2$ where a, b are arbitrary constants, then ____

(a) $\frac{d^2y}{dx^2} = 2xy$ **(b)** $x\frac{d^2y}{dx^2} = y_1$ (c) $x\frac{d^2y}{dx^2} - \frac{dy}{dx} + y = 0$ (d) $x\frac{d^2y}{dx^2} = 2xy$

38) Match List - I with List II

	LIST I		**LIST II**
i	$\begin{bmatrix} a & b \\ b & a \end{bmatrix}$	a	Identity
ii	$\begin{bmatrix} 0 & b \\ -b & 0 \end{bmatrix}$	b	Singular matrix
iii	$\begin{bmatrix} a & a \\ b & b \end{bmatrix}$	c	Skew-Symmetric
iv	$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$	d	Symmetric

The Correct match is _____

(a)

i	ii	iii	iv
d	c	b	a

(b)

i	**ii**	**iii**	**iv**
c	**d**	**b**	**a**

(c)

i	ii	iii	iv
b	a	d	c

(d)

i	ii	iii	iv
b	d	a	c

39) Choose the incorrect pair?

(a) 330^o - $\frac{11\pi}{6}$radians **(b)** $\frac{7\pi^c}{3}$ **- 200°** (c) 0^o - 0^c (d) $2\pi^c$ - 360^o

40) 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 $2 \le x \le 3$ (d) $5 - 2x$ for $2 \le x \le 3$

41) If $f(0) = 0, f'(0) = 2$, then the derivative of $y = f(f(f(f(x))))$ at x = 0 is, _____

(a) 2 (b) 8 **(c) 16** (d) 4

42) If $y = ax^{n+1} + bx^{-n}$, then $x^2 \frac{d^2y}{dx^2}$ is equal to _____

(a) $n(n-1)y$ **(b)** $n(n+1)y$ (c) ny (d) n^2y

43) If y = a sin x + b cos x, then $y^2 + \left(\frac{dy}{dx}\right)^2$ is a _____

(a) function of x (b) function of y (c) function of x and y **(d) constant**

44) $\frac{d}{dx}\cos^{-1}\sqrt{\cos x}$ is equal to _____

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

45) If $y = \frac{\sin^{-1} x}{\sqrt{1-x^2}}$, then $\left(1 - x^2\right)\frac{dy}{dx}$ is equal to _____

(a) a + b **(b) 1 + xy** (c) 1- xy (d) xy - 2

46) If $y = \cot^{-1}\left[\frac{\sqrt{1+\sin x}+\sqrt{1-\sin x}}{\sqrt{1+\sin x}-\sqrt{1-\sin x}}\right]$, then $\frac{dy}{dx} =$ _____

(a) $\frac{1}{2}$ (b) $\frac{3}{2}$ (c) 3 (d) 1

47) $\frac{d^n}{dx^n}(\log x) =$ _____

(a) $\frac{(n-1)!}{x^n}$ (b) $\frac{n!}{x^n}$ (c) $\frac{(n-2)}{x^n.}!$ **(d)** $(-1)^{n-1}\frac{(n-1)!}{x^n}$

48) If $y = \sqrt{\log x + \sqrt{\log x + \sqrt{\log x + \ldots \infty}}}$, then $\frac{dy}{dx}$ is ____

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

49) If f(x) = mx + c and f(0) = f'(0) = 1 then f(3) is :

(a) 3 (b) 1 **(c) 4** (d) 2

50) The degree value of 2π radian is :

(a) 90° **(b) 360°** (c) 0° (d) 180°