SET 4 - Limits and Derivatives

Q1. $\lim_{x\to 0} \frac{\sin\ 6x}{3x} =$

$$\lim_{x\to 0} \frac{\sin\ 6x}{3x} =$$

(a) 0
(b) 1
(c) 2
(d) 6

Q2. Derivative of x^{12} with respect to x is:

x के सापेक्ष x^{12} का अवकलज है:

(a) $12x^{11}$
(b) $11x^{12}$
(c) $12x^{12}$
(d) x^{11}

Q3. $\lim_{x\to 4}(5x - 7) =$

$$\lim_{x\to 4}(5x - 7) =$$

(a) 13
(b) 20
(c) 27
(d) 33

Q4. Derivative of the constant function f(x) = -3 is:

अचर फलन f(x) = -3 का अवकलज है:

(a) -3
(b) 0
(c) 1
(d) x

Q5. $\lim_{x\to 0} \frac{1-\cos\ 4x}{x^2} =$

$$\lim_{x\to 0} \frac{1 - \cos\ 4x}{x^2} =$$

(a) 0
(b) 8
(c) 4
(d) 2

Q6. Derivative of $\cos x$ **at** $x = \pi$ **is:**

$\cos x$ का $x = \pi$ पर अवकलज है:

(a) 0
(b) 1
(c) -1
(d) Does not exist / अस्तित्व में नहीं है

Q7. $\lim_{x\to 2} \frac{x^2-3x+2}{x-2} =$

$$\lim_{x\to 2} \frac{x^2-3x+2}{x-2} =$$

(a) 0
(b) 1
(c) 2
(d) 3

Q8. Derivative of 10^x **with respect to x is:**

x के सापेक्ष 10^x का अवकलज है:

(a) $x10^{x-1}$
(b) 10^x
(c) $10^x \ln\ 10$
(d) $\ln 10$

Q9. $\lim_{x\to\infty} \frac{100}{x^3} =$

$$\lim_{x\to\infty} \frac{100}{x^3} =$$

(a) 0
(b) 100
(c) ∞
(d) -∞

Q10. Derivative of $\ln(7x)$ **is:**

$\ln(7x)$ का अवकलज है:

(a) $\frac{1}{7x}$
(b) $\frac{1}{x}$
(c) $\frac{7}{x}$
(d) 7

Q11. $\lim_{x\to 0} \frac{\tan\ 2x}{\sin\ 3x} =$

$$\lim_{x\to 0} \frac{\tan\ 2x}{\sin\ 3x} =$$

(a) 0
(b) 2/3
(c) 3/2
(d) 1

Q12. Derivative of $\sec x$ **at** $x = 0$ **is:**

$\sec x$का $x = 0$पर अवकलज है:

(a) 0
(b) 1
(c) -1
(d) ∞

Q13. $\lim_{x\to 0} \frac{e^{ax}-1}{x}$ **=(a constant)**

$\lim_{x\to 0} \frac{e^{ax}-1}{x}$ =(a अचर है)

(a) 0
(b) 1
(c) a
(d) e^a

Q14. Derivative of $\cot^{-1} x$ **is:**

$\cot^{-1} x$का अवकलज है:

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

(d) $\frac{1}{\sqrt{1+x^2}}$

Q15. $\lim_{x\to 1} \frac{x^5-1}{x-1} =$

$$\lim_{x\to 1} \frac{x^5-1}{x-1} =$$

(a) 1
(b) 3
(c) 5
(d) 10

Q16. Derivative of $x^2\cos x$**is:**

$x^2\cos x$का अवकलज है:

(a) $2x\cos x - x^2\sin x$
(b) $2x\cos x + x^2\sin x$
(c) $x^2\cos x - 2x\sin x$
(d) $2x\sin x - x^2\cos x$

Q17. $\lim_{x\to 0} \frac{\sin^{-1} x}{2x} =$

$$\lim_{x\to 0} \frac{\sin^{-1} x}{2x} =$$

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

Q18. Derivative of $\tan(5x+2)$**is:**

$\tan(5x+2)$का अवकलज है:

(a) $5\sec^2(5x+2)$
(b) $\sec^2(5x+2)$
(c) $5\tan(5x+2)$
(d) $\sec(5x+2)$

Q19. $\lim_{x\to 0} \frac{\log(1+3x)}{2x} =$

$$\lim_{x\to 0} \frac{\log(1+3x)}{2x} =$$

(a) 0
(b) 3/2

(c) 2/3
(d) 1

Q20. Derivative of e^{x^2} is:
e^{x^2} का अवकलज है:

(a) e^{x^2}
(b) $2xe^{x^2}$
(c) $x^2e^{x^2}$
(d) $2e^{x^2}$

Q21. $\lim_{x\to\infty}\left(1+\frac{1}{3x}\right)^x =$

$$\lim_{x\to\infty}\left(1+\frac{1}{3x}\right)^x =$$

(a) 1
(b) e^{1/3}
(c) e^3
(d) ∞

Q22. If $y = x^4 - 2x^3 + 3x^2 - 4x + 5$, then $\frac{dy}{dx} =$
यदि $y = x^4 - 2x^3 + 3x^2 - 4x + 5$, तो $\frac{dy}{dx} =$

(a) $4x^3 - 6x^2 + 6x - 4$
(b) $4x^3 - 2x^2 + 3x - 4$
(c) $4x^3 - 6x^2 + 3x - 4$
(d) $4x^3 - 6x^2 + 6x$

Q23. $\lim_{x\to 0}\frac{\sin\ x\tan\ x}{x^2} =$

$$\lim_{x\to 0}\frac{\sin\ x\tan\ x}{x^2} =$$

(a) 0
(b) 1
(c) 2
(d) ∞

Q24. Derivative of quotient: if $y = \frac{x-1}{x+1}$, then $\frac{dy}{dx} =$
भागफल का अवकलज: यदि $y = \frac{x-1}{x+1}$, तो $\frac{dy}{dx} =$

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

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

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

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

Q25. $\lim_{x\to 0} \frac{5^x-4^x}{x} =$

$$\lim_{x\to 0} \frac{5^x - 4^x}{x} =$$

(a) 0

(b) 1

(c) $\ln\ 5 - \ln\ 4$

(d) $\ln \frac{5}{4}$

Q26. Derivative of $y = x^{3/2}$ is:

$y = x^{3/2}$का अवकलज है:

(a) $\frac{3}{2}x^{1/2}$

(b) $\frac{3}{2}\sqrt{x}$

(c) Both (a) and (b) / (a) और (b) दोनों

(d) $\frac{2}{3}x^{-1/2}$

Q27. $\lim_{x\to 5} \frac{x^2-25}{x-5} =$

$$\lim_{x\to 5} \frac{x^2 - 25}{x - 5} =$$

(a) 0

(b) 5

(c) 10

(d) 25

Q28. Derivative of $y = (x + 2)^2$ is:

$y = (x + 2)^2$का अवकलज है:

(a) $2(x+2)$
(b) $2x+2$
(c) $x+2$
(d) $2x+4$

Q29. $\lim_{x\to 0} \frac{\sin\ 7x}{\sin\ 4x} =$

$$\lim_{x\to 0} \frac{\sin\ 7x}{\sin\ 4x} =$$

(a) 7/4
(b) 4/7
(c) 1
(d) 0

Q30. Derivative of $y = \frac{1}{\sqrt[3]{x}}$

is:

$$y = \frac{1}{\sqrt[3]{x}}$$

का अवकलज है:

(a) $-\frac{1}{3x^{4/3}}$
(b) $-\frac{1}{3\sqrt[3]{x^4}}$

(c) Both (a) and (b) / (a) और (b) दोनों
(d) $\frac{1}{3x^{-2/3}}$

Q31. $\lim_{x\to 0} \frac{\cos\ 5x-1}{x^2} =$

$$\lim_{x\to 0} \frac{\cos\ 5x-1}{x^2} =$$

(a) 0
(b) -25/2
(c) 25/2
(d) 5

Q32. Derivative of $y = \cos^3 x$**is:**

$y = \cos^3 x$का अवकलज है:

(a) $-3\cos^2 x\sin x$
(b) $3\cos^2 x\sin x$
(c) $-3\sin^3 x$
(d) $3\sin^2 x\cos x$

Q33. $\lim_{x\to 9}\frac{\sqrt{x}-3}{x-9} =$

$$\lim_{x\to 9}\frac{\sqrt{x}-3}{x-9} =$$

(a) 0
(b) 1/6
(c) 1/3
(d) 1

Q34. Derivative of $y = \ln(\cos^2 x)$**is:**
$y = \ln(\cos^2 x)$का अवकलज है:

(a) $-2\tan x$
(b) $2\tan x$
(c) $2\cot x$
(d) $-2\cot x$

Q35. $\lim_{x\to\infty}\frac{5x^4+2x^2+1}{10^{\ 4}+3x^3+5} =$

$$\lim_{x\to\infty}\frac{5x^4+2x^2+1}{10x^4+3x^3+5} =$$

(a) 0
(b) 1/2
(c) 5/10
(d) 1

Q36. Derivative of $y = e^{-x}$**is:**
$y = e^{-x}$का अवकलज है:

(a) e^{-x}
(b) $-e^{-x}$
(c) e^{x}
(d) $-e^{x}$

Q37. $\lim_{x\to 0} \frac{\sin x - \tan x}{x^3} =$

$$\lim_{x\to 0} \frac{\sin x - \tan x}{x^3} =$$

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

Q38. Derivative of $y = \frac{x}{\sin x}$**is:**

$y = \frac{x}{\text{si}}$**का अवकलज है:**

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

Q39. $\lim_{x\to 0} \frac{6^x - 1}{x} =$

$$\lim_{x\to 0} \frac{6^x - 1}{x} =$$

(a) 0
(b) 1
(c) $\ln 6$
(d) 6

Q40. Derivative of $y = \text{cosec}\,(3x)$**is:**

$y = \text{cosec}\,(3x)$**का अवकलज है:**

(a) $-3\text{cosec}\,(3x)\cot(3x)$
(b) $3\text{cosec}\,(3x)\cot(3x)$
(c) $-\text{cosec}\,(3x)\cot(3x)$
(d) $\text{cosec}\,(3x)\cot(3x)$

Q41. $\lim_{x\to 0} \frac{(1+x)^6 - 1}{x} =$

$$\lim_{x\to 0} \frac{(1+x)^6 - 1}{x} =$$

(a) 0
(b) 1

(c) 6
(d) 15

Q42. Derivative of $y = \sec^2 x$ is:

$y = \sec^2 x$का अवकलज है:

(a) $2\sec^2 x\tan\ x$
(b) $2\sec\ x\tan\ x$
(c) $\sec^2 x\tan\ x$
(d) $2\sec\ x$

Q43. $\lim_{x\to 0} \frac{\sin(ax)}{\sin(bx)} \times \frac{b}{a} =$

$$\lim_{x\to 0} \frac{\sin(ax)}{\sin(bx)} \times \frac{b}{a} =$$

(a) 0
(b) 1
(c) a/b
(d) b/a

Q44. Derivative of $y = \log(\sec\ x)$ is:

$y = \log(\sec\ x)$का अवकलज है:

(a) $\tan x$
(b) $\cot x$
(c) $\sec\ x\tan\ x$
(d) $\operatorname{cosec} x$

Q45. $\lim_{x\to 0} \frac{\sqrt{1+2x}-1}{x} =$

$$\lim_{x\to 0} \frac{\sqrt{1+2x}-1}{x} =$$

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

Q46. Derivative of $y = \sin\ x \cdot e^x$ is:

$y = \sin\ x \cdot e^x$का अवकलज है:

(a) $e^x(\sin\ x + \cos\ x)$
(b) $e^x(\sin\ x - \cos\ x)$
(c) $e^x \sin\ x$
(d) $e^x \cos\ x$

Q47. $\lim_{x\to 0} \frac{\tan^2 3x}{x^2} =$

$$\lim_{x\to 0} \frac{\tan^2 3x}{x^2} =$$

(a) 0
(b) 1
(c) 9
(d) 3

Q48. Derivative of $y = \tan^{-1}(2x)$**is:**
$y = \tan^{-1}(2x)$का अवकलज है:

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

Q49. $\lim_{x\to\infty} \frac{2x+5}{3x^2+1} =$

$$\lim_{x\to\infty} \frac{2x+5}{3x^2+1} =$$

(a) 0
(b) 2/3
(c) 1
(d) ∞

Q50. Derivative of $y = \frac{1}{2}(e^x + e^{-x})$**is:**
$y = \frac{1}{2}(e^x + e^{-x})$का अवकलज है:

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

ANSWERS SET 4:

1. c, 2. a, 3. a, 4. b, 5. b, 6. c, 7. b, 8. c, 9. a, 10. b,
2. b, 12. a, 13. c, 14. a, 15. c, 16. a, 17. b, 18. a, 19. b, 20. b,
3. b, 22. a, 23. b, 24. a, 25. d, 26. c, 27. c, 28. a, 29. a, 30. c,
4. b, 32. a, 33. b, 34. a, 35. b, 36. b, 37. b, 38. a, 39. c, 40. a,
5. c, 42. a, 43. b, 44. a, 45. b, 46. a, 47. c, 48. b, 49. a, 50. a