

SET 1 - Limits and Derivatives

Q1. $\lim_{x \rightarrow 0} \frac{\sin x}{x} =$

$$\lim_{x \rightarrow 0} \frac{\sin x}{x} =$$

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

Q2. The derivative of x^n with respect to x is:

x के सापेक्ष x^n का अवकलज है:

- (a) nx^{n-1}
- (b) nx^n
- (c) x^{n-1}
- (d) nx^{n+1}

Q3. $\lim_{x \rightarrow 2} (3x + 1) =$

$$\lim_{x \rightarrow 2} (3x + 1) =$$

- (a) 5
- (b) 6
- (c) 7
- (d) 8

Q4. The derivative of a constant function is:

एक अचर फलन का अवकलज है:

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

Q5. $\lim_{x \rightarrow 0} \frac{1 - \cos x}{x} =$

$$\lim_{x \rightarrow 0} \frac{1 - \cos x}{x} =$$

- (a) 0
- (b) 1
- (c) ∞
- (d) $1/2$

Q6. Derivative of $\sin x$ with respect to x is:

x के सापेक्ष $\sin x$ का अवकलज है:

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

Q7. $\lim_{x \rightarrow 1} \frac{x^2 - 1}{x - 1} =$

$$\lim_{x \rightarrow 1} \frac{x^2 - 1}{x - 1} =$$

- (a) 0
- (b) 1
- (c) 2
- (d) Does not exist / अस्तित्व में नहीं है

Q8. Derivative of e^x with respect to x is:

x के सापेक्ष e^x का अवकलज है:

- (a) e^x
- (b) xe^{x-1}
- (c) 0
- (d) 1

Q9. $\lim_{x \rightarrow \infty} \frac{1}{x} =$

$$\lim_{x \rightarrow \infty} \frac{1}{x} =$$

- (a) 0
- (b) 1
- (c) ∞
- (d) $-\infty$

Q10. Derivative of $\log_e x (\ln x)$ with respect to x is:

x के सापेक्ष $\log_e x (\ln x)$ का अवकलज है:

- (a) $\frac{1}{x}$
- (b) x
- (c) e^x
- (d) 0

Q11. $\lim_{x \rightarrow 0} \frac{\tan x}{x} =$

$$\lim_{x \rightarrow 0} \frac{\tan x}{x} =$$

- (a) 0
- (b) 1
- (c) ∞
- (d) -1

Q12. Derivative of $\cos x$ with respect to x is:

x के सापेक्ष $\cos x$ का अवकलज है:

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

Q13. $\lim_{x \rightarrow 3} \frac{x^2 - 9}{x - 3} =$

$$\lim_{x \rightarrow 3} \frac{x^2 - 9}{x - 3} =$$

- (a) 0
- (b) 3
- (c) 6
- (d) 9

Q14. Derivative of $\tan x$ with respect to x is:

x के सापेक्ष $\tan x$ का अवकलज है:

- (a) $\sec^2 x$
- (b) $\sec x \tan x$
- (c) $\cot x$
- (d) $-\operatorname{cosec}^2 x$

Q15. $\lim_{x \rightarrow 0} \frac{e^x - 1}{x} =$

$$\lim_{x \rightarrow 0} \frac{e^x - 1}{x} =$$

- (a) 0
- (b) 1
- (c) e
- (d) ∞

Q16. Derivative of $\sec x$ with respect to x is:

x के सापेक्ष $\sec x$ का अवकलज है:

- (a) $\sec x \tan x$
- (b) $\operatorname{cosec} x \cot x$
- (c) $-\operatorname{cosec}^2 x$
- (d) $-\sec x \tan x$

Q17. $\lim_{x \rightarrow 0} \frac{a^x - 1}{x} = (a > 0)$

$$\lim_{x \rightarrow 0} \frac{a^x - 1}{x} = (a > 0)$$

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

Q18. Derivative of $\cot x$ with respect to x is:

x के सापेक्ष $\cot x$ का अवकलज है:

- (a) $\operatorname{cosec}^2 x$
- (b) $-\operatorname{cosec}^2 x$
- (c) $\sec^2 x$
- (d) $-\sec^2 x$

Q19. $\lim_{x \rightarrow 4} \frac{\sqrt{x} - 2}{x - 4} =$

$$\lim_{x \rightarrow 4} \frac{\sqrt{x} - 2}{x - 4} =$$

- (a) 0
- (b) $1/4$

(c) $1/2$

(d) 1

Q20. Derivative of cosec x with respect to x is:

x के सापेक्ष cosec x का अवकलज है:

(a) $-\text{cosec } x \cot x$

(b) $\text{cosec } x \cot x$

(c) $-\sec x \tan x$

(d) $\sec x \tan x$

Q21. $\lim_{x \rightarrow 0} \frac{\sin 5x}{x} =$

$$\lim_{x \rightarrow 0} \frac{\sin 5x}{x} =$$

(a) 0

(b) 1

(c) 5

(d) $1/5$

Q22. If $y = x^3 + 2x^2 + x + 1$, then $\frac{dy}{dx} =$

यदि $y = x^3 + 2x^2 + x + 1$, तो $\frac{dy}{dx} =$

(a) $3x^2 + 4x + 1$

(b) $3x^2 + 2x + 1$

(c) $x^2 + 4x + 1$

(d) $3x^2 + 4x$

Q23. $\lim_{x \rightarrow 2} \frac{x^3 - 8}{x - 2} =$

$$\lim_{x \rightarrow 2} \frac{x^3 - 8}{x - 2} =$$

(a) 4

(b) 8

(c) 12

(d) 16

Q24. Derivative of constant multiplied by function: $\frac{d}{dx} [kf(x)] =$

अचर से गुणा किए गए फलन का अवकलज: $\frac{d}{dx} [kf(x)] =$

(a) $kf'(x)$

(b) $f'(x)$

(c) k

(d) 0

Q25. $\lim_{x \rightarrow 0} \frac{\sin^{-1} x}{x} =$

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

(a) 0

(b) 1

(c) ∞

(d) $\pi/2$

Q26. If $y = \frac{1}{x}$, then $\frac{dy}{dx} =$

यदि $y = \frac{1}{x}$, तो $\frac{dy}{dx} =$

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

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

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

(d) x^2

Q27. $\lim_{x \rightarrow 0} (1+x)^{1/x} =$

$$\lim_{x \rightarrow 0} (1+x)^{1/x} =$$

(a) 0

(b) 1

(c) e

(d) ∞

Q28. Derivative of sum of two functions: $\frac{d}{dx} [u(x) + v(x)] =$

दो फलनों के योग का अवकलज: $\frac{d}{dx} [u(x) + v(x)] =$

(a) $u'(x) + v'(x)$

(b) $u'(x)v'(x)$

(c) $u(x)v'(x) + u'(x)v(x)$

(d) $\frac{u'(x)}{v'(x)}$

Q29. $\lim_{x \rightarrow 0} \frac{\log(1+x)}{x} =$

$$\lim_{x \rightarrow 0} \frac{\log(1+x)}{x} =$$

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

Q30. If $y = \sqrt{x}$

, then $\frac{dy}{dx} =$

यदि $y = \sqrt{x}$

, तो $\frac{dy}{dx} =$

(a) $\frac{1}{2\sqrt{x}}$

(b) $\frac{1}{\sqrt{x}}$

(c) $2\sqrt{x}$

(d) $\sqrt{x}$

Q31. $\lim_{x \rightarrow \pi/2} \frac{\cos x}{\frac{\pi}{2} - x} =$

$$\lim_{x \rightarrow \pi/2} \frac{\cos x}{\frac{\pi}{2} - x} =$$

- (a) 0
- (b) 1
- (c) -1
- (d) ∞

Q32. Derivative of product rule: $\frac{d}{dx} [u(x)v(x)] =$

गुणनफल नियम: $\frac{d}{dx} [u(x)v(x)] =$

(a) $u'(x)v'(x)$

(b) $u(x)v'(x) + u'(x)v(x)$

(c) $u(x)v'(x) - u'(x)v(x)$

(d) $\frac{u'(x)}{v'(x)}$

Q33. $\lim_{x \rightarrow 0} \frac{\sin 3x}{\sin 5x} =$

$$\lim_{x \rightarrow 0} \frac{\sin 3x}{\sin 5x} =$$

- (a) 3/5
- (b) 5/3
- (c) 1
- (d) 0

Q34. Quotient rule: $\frac{d}{dx} \left[\frac{u(x)}{v(x)} \right] =$

भागफल नियम: $\frac{d}{dx} \left[\frac{u(x)}{v(x)} \right] =$

- (a) $\frac{u'(x)}{v'(x)}$
- (b) $\frac{u'(x)v(x) - u(x)v'(x)}{[v(x)]^2}$
- (c) $\frac{u'(x)v(x) + u(x)v'(x)}{[v(x)]^2}$
- (d) $\frac{u(x)v'(x) - u'(x)v(x)}{[v(x)]^2}$

Q35. $\lim_{x \rightarrow 0} \frac{\sin x}{x}$ (where x^0 means x in degrees) is approximately:

$\lim_{x \rightarrow 0} \frac{\sin x^0}{x}$ (जहाँ x^0 का मतलब x डिग्री में है) लगभग है:

- (a) 0
- (b) 1
- (c) $\pi/180$
- (d) $180/\pi$

Q36. If $y = \sin x + \cos x$, then $\frac{dy}{dx} =$

यदि $y = \sin x + \cos x$, तो $\frac{dy}{dx} =$

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

Q37. $\lim_{x \rightarrow 0} \frac{\tan 2x}{3x} =$

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

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

Q38. Derivative of $y = x \sin x$ is:

$y = x \sin x$ का अवकलज है:

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

Q39. $\lim_{x \rightarrow 0} \frac{e^{3x} - 1}{x} =$

$$\lim_{x \rightarrow 0} \frac{e^{3x} - 1}{x} =$$

- (a) 0
- (b) 1
- (c) 3
- (d) e^3

Q40. If $y = \frac{x+1}{x-1}$, then $\frac{dy}{dx} =$

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

Q41. $\lim_{x \rightarrow 1} \frac{x^3 - 3x + 2}{x^2 - 1} =$

$$\lim_{x \rightarrow 1} \frac{x^3 - 3x + 2}{x^2 - 1} =$$

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

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

$y = \sin^2 x$ का अवकलज है:

- (a) $2\sin x$
- (b) $2\sin x \cos x$
- (c) $\sin 2x$
- (d) Both (b) and (c) / (b) और (c) दोनों

Q43. $\lim_{x \rightarrow 0} \frac{\sin(ax)}{\sin(bx)} =$ (where $a, b \neq 0$)

$\lim_{x \rightarrow 0} \frac{\sin(ax)}{\sin(bx)} =$ (जहाँ $a, b \neq 0$)

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

Q44. Derivative of $y = e^{2x}$ is:

$y = e^{2x}$ का अवकलज है:

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

Q45. $\lim_{x \rightarrow \infty} \frac{2x^2 + 3x + 1}{x^2 + 4x + 5} =$

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

- (a) 0
- (b) 1
- (c) 2
- (d) ∞

Q46. Derivative of $y = \log(2x)$ is:

$y = \log(2x)$ का अवकलज है:

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

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

(d) $\frac{1}{x! - 10}$

Q47. $\lim_{x \rightarrow 0} \frac{\sqrt{1+x}-1}{x} =$

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

(a) 0

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

(c) 1

(d) 2

Q48. Derivative of $y = a^x$ ($a > 0, a \neq 1$) is:

$y = a^x$ ($a > 0, a \neq 1$) का अवकलज है:

(a) $a^x \ln a$

(b) a^x

(c) xa^{x-1}

(d) $\ln a$

Q49. $\lim_{x \rightarrow 0} \frac{(1+x)^n - 1}{x} =$

$$\lim_{x \rightarrow 0} \frac{(1+x)^n - 1}{x} =$$

(a) 0

(b) 1

(c) n

(d) n!

Q50. Derivative of $y = \sin(3x)$ is:

$y = \sin(3x)$ का अवकलज है:

(a) $3\cos(3x)$

(b) $\cos(3x)$

(c) $3\sin(3x)$

(d) $-\cos(3x)$

ANSWERS SET 1:

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