

SET 2 - Limits and Derivatives

Q1. $\lim_{x \rightarrow 0} \frac{\sin 7x}{x} =$

$$\lim_{x \rightarrow 0} \frac{\sin 7x}{x} =$$

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

Q2. Derivative of x^{10} with respect to x is:

x के सापेक्ष x^{10} का अवकलज है:

- (a) $10x^9$
- (b) $9x^{10}$
- (c) $10x^{10}$
- (d) x^9

Q3. $\lim_{x \rightarrow 5} (2x - 3) =$

$$\lim_{x \rightarrow 5} (2x - 3) =$$

- (a) 5
- (b) 7
- (c) 10
- (d) 12

Q4. Derivative of number 5 is:

संख्या 5 का अवकलज है:

- (a) 5
- (b) 0
- (c) 1
- (d) x

Q5. $\lim_{x \rightarrow 0} \frac{\tan 3x}{x} =$

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

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

Q6. Derivative of $\cos x$ at $x = 0$ is:

$\cos x$ का $x = 0$ पर अवकलज है:

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

Q7. $\lim_{x \rightarrow 2} \frac{x^2 - 4}{x - 2} =$

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

- (a) 0
- (b) 2
- (c) 4
- (d) Does not exist / अस्तित्व में नहीं है

Q8. Derivative of 2^x with respect to x is:

x के सापेक्ष 2^x का अवकलज है:

- (a) $x2^{x-1}$
- (b) 2^x
- (c) $2^x \ln 2$
- (d) $\ln 2$

Q9. $\lim_{x \rightarrow \infty} \frac{3}{x} =$

$$\lim_{x \rightarrow \infty} \frac{3}{x} =$$

- (a) 0
- (b) 3
- (c) ∞
- (d) $-\infty$

Q10. Derivative of $\ln(3x)$ is:

$\ln(3x)$ का अवकलज है:

(a) $\frac{1}{3x}$

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

(c) $\frac{3}{x}$

(d) 3

Q11. $\lim_{x \rightarrow 0} \frac{1 - \cos 2x}{x} =$

$$\lim_{x \rightarrow 0} \frac{1 - \cos 2x}{x} =$$

(a) 0

(b) 1

(c) 2

(d) 4

Q12. Derivative of $\sec x$ at $x = \pi/4$ is:

$\sec x$ का $x = \pi/4$ पर अवकलज है:

(a) $\sqrt{2}$

(b) 2

(c) 1

(d) 0

Q13. $\lim_{x \rightarrow 0} \frac{e^{2x} - 1}{x} =$

$$\lim_{x \rightarrow 0} \frac{e^{2x} - 1}{x} =$$

(a) 0

(b) 1

(c) 2

(d) e^2

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

$\tan^{-1} x$ 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. $\lim_{x \rightarrow 1} \frac{x^4 - 1}{x - 1} =$

$$\lim_{x \rightarrow 1} \frac{x^4 - 1}{x - 1} =$$

(a) 1

(b) 2

(c) 3

(d) 4

Q16. Derivative of $x \cos x$ is:

$x \cos x$ का अवकलज है:

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

(b) $\cos x + x \sin x$

(c) $-\cos x + x \sin x$

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

Q17. $\lim_{x \rightarrow 0} \frac{\sin^{-1} 3x}{x} =$

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

(a) 0

(b) 1

(c) 3

(d) $1/3$

Q18. Derivative of $\sin(2x + 3)$ is:

$\sin(2x + 3)$ का अवकलज है:

(a) $2 \cos(2x + 3)$

(b) $\cos(2x + 3)$

(c) $2 \sin(2x + 3)$

(d) $\cos(2x)$

Q19. $\lim_{x \rightarrow 0} \frac{\log(1+5x)}{x} =$

$$\lim_{x \rightarrow 0} \frac{\log(1+5x)}{x} =$$

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

Q20. Derivative of $e^{\sin x}$ is:

$e^{\sin x}$ का अवकलज है:

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

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

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

- (a) 0
- (b) 1
- (c) e
- (d) ∞

Q22. If $y = 3x^4 - 2x^3 + x - 7$, then $\frac{dy}{dx} =$

यदि $y = 3x^4 - 2x^3 + x - 7$, तो $\frac{dy}{dx} =$

- (a) $12x^3 - 6x^2 + 1$
- (b) $12x^3 - 6x^2$
- (c) $12x^3 - 6x^2 + x$
- (d) $12x^3 - 2x^2 + 1$

Q23. $\lim_{x \rightarrow 0} \frac{\sin x \cos x}{x} =$

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

- (a) 0
- (b) 1

- (c) $1/2$
 (d) 2

Q24. Derivative of quotient: if $y = \frac{x}{x+1}$, then $\frac{dy}{dx} =$

भागफल का अवकलज: यदि $y = \frac{x}{x+1}$, तो $\frac{dy}{dx} =$

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

Q25. $\lim_{x \rightarrow 0} \frac{a^x - b^x}{x} = (a, b > 0)$

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

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

Q26. Derivative of $\sqrt{x^3}$

is:

$$\sqrt{x^3}$$

का अवकलज है:

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

Q27. $\lim_{x \rightarrow 2} \frac{x^2 + 3x - 1}{x - 2} =$

$$\lim_{x \rightarrow 2} \frac{x^2 + 3x - 10}{x - 2} =$$

- (a) 0
- (b) 5
- (c) 7
- (d) 10

Q28. Derivative of $y = (x + 1)(x + 2)$ is:

$y = (x + 1)(x + 2)$ का अवकलज है:

- (a) $2x + 3$
- (b) $2x + 1$
- (c) $x + 3$
- (d) $2x$

Q29. $\lim_{x \rightarrow 0} \frac{\sin 2x}{\tan 3x} =$

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

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

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

is:

$$y = \frac{1}{\sqrt{x}}$$

का अवकलज है:

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

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

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

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

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

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

Q32. Derivative of $y = \sin x \cos x$ is:

$y = \sin x \cos x$ का अवकलज है:

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

Q33. $\lim_{x \rightarrow 1} \frac{\sqrt{x}-1}{x-1} =$

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

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

Q34. Derivative of $y = \ln(x^2)$ is:

$y = \ln(x^2)$ का अवकलज है:

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

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

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

- (a) 0
- (b) 3/5

- (c) 1
(d) ∞

Q36. Derivative of $y = e^{x^2}$ is:

$y = e^{x^2}$ का अवकलज है:

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

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

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

- (a) 0
(b) $1/6$
(c) $-1/6$
(d) 1

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

$y = \frac{\sin x}{x}$ का अवकलज है:

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

Q39. $\lim_{x \rightarrow 0} \frac{2^x - 3^x}{x} =$

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

- (a) 0
(b) 1
(c) $\ln 2 - \ln 3$
(d) $\ln \frac{2}{3}$

Q40. Derivative of $y = \tan(3x + 1)$ is:

$y = \tan(3x + 1)$ का अवकलज है:

- (a) $3\sec^2(3x + 1)$
- (b) $\sec^2(3x + 1)$
- (c) $3\tan(3x + 1)$
- (d) $\sec(3x + 1)$

Q41. $\lim_{x \rightarrow 0} \frac{(1+x)^5 - 1}{x} =$

$$\lim_{x \rightarrow 0} \frac{(1+x)^5 - 1}{x} =$$

- (a) 0
- (b) 1
- (c) 5
- (d) 10

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

$y = \cos^2 x$ का अवकलज है:

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

Q43. $\lim_{x \rightarrow 0} \frac{\sin(2x)}{\sin(4x)} =$

$$\lim_{x \rightarrow 0} \frac{\sin(2x)}{\sin(4x)} =$$

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

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

$y = \log(\cos x)$ का अवकलज है:

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

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

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

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

Q46. Derivative of $y = xe^x$ is:

$y = xe^x$ का अवकलज है:

- (a) e^x
- (b) xe^x
- (c) $e^x(x+1)$
- (d) $e^x(x-1)$

Q47. $\lim_{x \rightarrow 0} \frac{1 - \cos^2 x}{x^2} =$

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

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

Q48. Derivative of $y = \sin^{-1}(2x)$ is:

$y = \sin^{-1}(2x)$ का अवकलज है:

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

Q49. $\lim_{x \rightarrow \infty} \frac{x+1}{x^2+1} =$

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

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

Q50. Derivative of $y = \frac{e^x + e^{-x}}{2}$ is:

$y = \frac{e^x + e^{-x}}{2}$ का अवकलज है:

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

ANSWERS SET 2:

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