

Lakshya JEE 2026

Mathematics

DPP: 1

Method of Differentiation

Q1 If $y = \frac{1+x^2+x^4}{1+x+x^2}$ and $\frac{dy}{dx} = ax + b$; find $a + b$.

- (A) 0 (B) -1
(C) 1 (D) 2

Q2 If $y = \frac{x^2+2^x}{e^x}$ and $\frac{dy}{dx} = \frac{x(2p+qx)+2^x(\ln 2+r)}{e^x}$, find

- $p + qr$
(A) -2 (B) 2
(C) 0 (D) 1

Q3 Derivative of y , if $y = x \sin x \log x$.

- (A) $\sin x \log x + x \cos x \log x + \sin x$
(B) $\sin x + \cos x \log x + \sin x$
(C) $\cos x \log x + x \cos x \log x + \sin x$
(D) $\sin x \log x + x \sin x \log x + \cos x$

Q4 If $y = \sqrt{x} + x\sqrt{x} + x^2\sqrt{x} + x^3\sqrt{x}$, find $\frac{dy}{dx}$

- (A) $\frac{1}{2\sqrt{x}} + \frac{3}{2}\sqrt{x} + \frac{5}{2}x^{1/2} + \frac{7}{2}x^{5/2}$
(B) $\frac{1}{2\sqrt{x}} + \frac{3}{2\sqrt{x}} + \frac{5}{2}x^{3/2} + \frac{7}{2}x^{5/2}$
(C) $\frac{1}{2\sqrt{x}} + \frac{3}{2}\sqrt{x} + \frac{5}{2}x^{3/2} + \frac{7}{2}x^{5/2}$
(D) $\frac{1}{2\sqrt{x}} + \frac{3}{2}\sqrt{x} + \frac{5}{2}x^{1/2} + \frac{7}{2}x^{3/2}$

Q5 If $y = \log(\sqrt{x-1} - \sqrt{x+1})$, find $\frac{dy}{dx}$

- (A) $\frac{-1}{2\sqrt{x-2}}$
(B) $\frac{1}{2\sqrt{x^2-2}}$
(C) $\frac{-1}{2\sqrt{x^2-1}}$
(D) $\frac{1}{2\sqrt{x^2+2}}$

Q6 If $y = \log(\sin x + \cos x)$, find $\frac{dy}{dx}$

- (A) $\cot\left(\frac{\pi}{4} - x\right)$

(B) $\cot\left(\frac{\pi}{4} + x\right)$

(C) $\tan\left(\frac{\pi}{4} + x\right)$

(D) $\tan\left(\frac{\pi}{4} - x\right)$

Q7 If $y = \log_{\sin x}(\tan x)$, then $\left(\frac{dy}{dx}\right)_{\pi/4}$ is equal

to:

(A) $\frac{4}{\log 2}$

(B) $-4 \log 2$

(C) $\frac{-4}{\log 2}$

(D) None of these

Q8 If $f(x^2) = x^4 + x^3 + 1$, find $f'(x^4)$

(A) $2x^2 + \frac{3}{2}x$

(B) $2x^4 + \frac{3}{2}x^2$

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

(D) $x^8 + x^6 + 1$

Q9 If $f(x) = \frac{x-1}{x+1}$, find $\frac{d(f(f(f(x))))}{dx}$

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

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

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

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

Q10 If $xy = 1$, then $\frac{dy}{dx}$

(A) y^2

(B) x^2

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

(D) $-y^2$



Answer Key

Q1 (C)

Q2 (B)

Q3 (A)

Q4 (C)

Q5 (C)

Q6 (D)

Q7 (C)

Q8 (B)

Q9 (A)

Q10 (D)



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