

VERY SHORT ANSWER TYPE QUESTIONS

Find the derivatives of the following functions w.r.t. x (Q. No. 1-2):

1. (i) e^{x^3} (ii) 4^{x+9} (iii) $e^{\sec^2 x} + 3 \cos^{-1} x$
- (iv) $a^{\tan x}$ (v) a^{7x+4} (vi) $3^{\sin^2 x}$
2. (i) $\cos^{-1} e^x$ (ii) $e^x \sin x$ (iii) $\frac{1}{x} e^x$
- (iv) $e^{\sin^{-1}(x+1)}$ (v) $e^{\cos x}$ (vi) 10^{10x}

LONG ANSWER-I TYPE QUESTIONS

Differentiate the following functions w.r.t. x (Q. No. 3-4):

3. (i) $x^3 e^x \cos x$ (ii) $\frac{e^x}{\sin x}$ (iii) $\frac{e^x(x-1)}{x^2+1}$
- (iv) $\sin^{-1} \left(\frac{2^{x+1} \cdot 3^x}{1+(36)^x} \right)$ (v) $\frac{e^x + e^{-x}}{e^x - e^{-x}}$ (vi) $\sin^{-1} \left(\frac{2^{x+1}}{1+4^x} \right)$
4. (i) $2^x e^{\sin^{-1} x}$ (ii) $e^{\sqrt{1-x^2}} \tan x$ (iii) $xe^{\sqrt{\sin x}}$
- (iv) $x^{-1/3} e^x$ (v) $e^{\sin x} \sin e^x$ (vi) $e^{\cot^{-1} x^2}$

VERY SHORT ANSWER TYPE QUESTIONS

Find the derivatives of the following functions w.r.t. x :

1. (i) $\log x^2$
(iii) $\log \cos x$
(v) $\sin(\log x)$
2. (i) $\cos(\log x)^2$
(iii) $\frac{1}{\log \cos x}$
(v) $\frac{e^{2x}}{\log x}$
3. (i) $x^5 + \log x + 7$
(iii) $e^x + 3 \sec x + \log x^2$
4. (i) $\frac{x^2 + e^x}{\log x + 20}$
(iii) $\frac{\sin x + \log x}{x^7 + e^x}$
- (ii) $\log \sqrt{x}$
(iv) $\log_a \sec x$
(vi) $\log(x^2 + a^2)$
- (ii) $\log \tan \left(\frac{\pi}{4} + \frac{x}{2} \right)$
(iv) $5^{\log \sin x}$
(vi) $\log_7(\log x)$
- (ii) $3 \tan x + 5 \log_a x + \sqrt{x} - 3e^x + \frac{1}{x}$
(iv) $\cot x + 2 \cos x + 3 \sin x - \frac{1}{2} e^x - \log_a x$
- (ii) $\frac{\log x - 4x^3}{\log x + 4x^3}$
(iv) $\tan^{-1} \frac{a}{x} + \log \sqrt{\frac{x-a}{x+a}}$

Find the derivatives of the following functions w.r.t. x (Q. No. 5-8):

5. (i) $e^{-ax^2} \sin \log x$

(ii) $\sin (e^x \log x)$

(iii) $\frac{\log x}{1+x \log x}$

(iv) $\frac{e^x + \log x}{\sin 3x}$

(v) $e^{\log (x + \sqrt{x^2 + a^2})}$

(vi) $\log \sqrt{\frac{1 + \sin^2 x}{1 - \tan x}}$

6. (i) $\log \frac{a + b \tan x}{a - b \tan x}$

(ii) $\log \frac{1 + \sqrt{x}}{1 - \sqrt{x}}$

(iii) $\log \frac{1 - x \sin x}{1 + x \sin x}$

(iv) $\log \sqrt{\frac{x + ab}{x - ab}}$

(v) $\log \sqrt{\frac{1 + \sin x}{1 - \sin x}}$

(vi) $\log \sqrt{\frac{1 - \cos x}{1 + \cos x}}$

7. (i) $\log \frac{\sqrt{a+x} + \sqrt{a-x}}{\sqrt{a+x} - \sqrt{a-x}}$

(ii) $\log \frac{\sqrt{a+bx} - \sqrt{a-bx}}{\sqrt{a+bx} + \sqrt{a-bx}}$

(iii) $\log \left| \frac{a - b \cos x}{a + b \cos x} \right|$

8. (i) $x \sqrt{x^2 + 1} + \log (x + \sqrt{x^2 + 1})$

(ii) $\frac{x \sqrt{x^2 - a^2}}{2} - \frac{a^2}{2} \log \frac{x + \sqrt{x^2 - a^2}}{a}$

(iii) $2x \tan^{-1} x - \log (1 + x^2)$

(iv) $\frac{x \cos^{-1} x}{\sqrt{1-x^2}} - \log \sqrt{1-x^2}$