

Evaluate the following integrals (Q. No. 1-9):

1. (i) $\int \frac{x^2}{x^3 + 1} dx$

(iii) $\int x^2 e^{x^3} dx$

(v) $\int (x^3 - 1)^{1/3} x^5 dx$

2. (i) $\int \frac{1}{x (\log x)^m} dx$

(iii) $\int \frac{(1 + \log x)^2}{x} dx$

(v) $\int \frac{\cot (\log x)}{x} dx$

3. (i) $\int \frac{\sin x}{1 + \cos x} dx$

(iii) $\int \frac{\sec^2 x}{\tan x + 3} dx$

(v) $\int \frac{1 - \cot x}{1 + \cot x} dx$

4. (i) $\int \frac{x + \cos 6x}{3x^2 + \sin 6x} dx$

(iii) $\int \frac{\sin 2x}{(a + b \cos 2x)^2} dx$

(v) $\int \frac{\sin x \cos x dx}{a^2 \sin^2 x + b^2 \cos^2 x}$

5. (i) $\int e^{\cos^2 x} \sin 2x dx$

(iii) $\int \sin x \sin (\cos x) dx$

(v) $\int \frac{\sin x}{(a + b \cos x)^2} dx$

6. (i) $\int \frac{x^{e-1} + e^{x-1}}{x^e + e^x} dx$

(iii) $\int \frac{dx}{e^x + e^{-x}}$

(v) $\int \frac{e^{2x} - 1}{e^{2x} + 1} dx$

(ii) $\int f'(ax + b) [f(ax + b)]^n dx$

(iv) $\int (4x + 2) \sqrt{x^2 + x + 1} dx$

(vi) $\int \cos 6x \sqrt{1 + \sin 6x} dx$

(ii) $\int \frac{\log x}{x} dx$

(iv) $\int \frac{\sin^6 x}{\cos^8 x} dx$

(vi) $\int \frac{(x + 1)(x + \log x)^2}{x} dx$

(ii) $\int \frac{\tan x \sec^2 x}{1 - \tan^2 x} dx$

(iv) $\int \frac{\left(\log \tan \frac{x}{2}\right)^2}{\sin x} dx$

(vi) $\int \frac{(x + 1)e^x}{\cos^2 (xe^x)} dx$

(ii) $\int \frac{\tan x}{\sec x + \cos x} dx$

(iv) $\int \sec x \log (\sec x + \tan x) dx$

(vi) $\int \cot x \log \sin x dx$

(ii) $\int e^x \operatorname{cosec}^2 (e^x) dx$

(iv) $\int \frac{1}{x^3} \cos \left(\frac{1}{x^2} \right) dx$

(vi) $\int \sqrt{\tan x} (1 + \tan^2 x) dx$

(ii) $\int (a + be^x)^6 e^x dx$

(iv) $\int \frac{1 - e^x}{1 + e^x} dx$

(vi) $\int \sqrt{e^x - 1} dx$

$$7. \quad (i) \int \frac{2x \tan^{-1} x^2}{1+x^4} dx \qquad (ii) \int \frac{\sec^2 (2 \tan^{-1} x)}{1+x^2} dx$$

$$(iii) \int \frac{x^3 \sin (\tan^{-1} x^4)}{1+x^8} dx \qquad (iv) \int \frac{x \sin^{-1} x^2}{\sqrt{1-x^4}} dx$$

$$(v) \int \frac{e^{\sin^{-1} x}}{\sqrt{1-x^2}} dx \qquad (vi) \int \frac{e^{\tan^{-1} x}}{1+x^2} dx$$

$$8. \quad (i) \int \frac{1}{\sqrt{1+\cos 2x}} dx \qquad (ii) \int \frac{1}{\sqrt{1+\sin 2x}} dx$$

$$(iii) \int \frac{1}{\cos^2 x (1-\tan x)^2} dx \qquad (iv) \int \frac{1}{\sqrt{x}} \cos \sqrt{x} dx$$

$$(v) \int \left(\frac{\tan (1/x)}{x} \right)^2 dx \qquad (vi) \int x^2 e^{x^3} \cos (e^{x^3}) dx$$

$$(vii) \int \frac{1-\sin 2x}{x+\cos^2 x} dx \qquad (viii) \int \frac{1+\sin 2x}{x+\sin^2 x} dx$$

$$9. \quad (i) \int \frac{\tan^4 \sqrt{x} \sec^2 \sqrt{x}}{\sqrt{x}} dx \qquad (ii) \int \frac{\sec x \operatorname{cosec} x}{\log \tan x} dx$$

$$(iii) \int \frac{\cos 2x dx}{(\cos x + \sin x)^2} \qquad (iv) \int \frac{e^{2x}}{\sqrt{1-e^{4x}}} dx$$

$$(v) \int \frac{(x^4 - x)^{1/4}}{x^5} dx \qquad (vi) \int \frac{1}{(e^x + e^{-x})^2} dx.$$