Integral Calculus - 1

Date Planned : __ / __ / __	Daily Tutorial Sheet - 1	Expected Duration : 90 Min
Actual Date of Attempt : __ / __ / __	Level - 1	Exact Duration :_____

Note (A) : Questions having asterisk marked against them may have more than one correct answer.

(B) : Questions having (▶) (Symbol) marked against them have a video solution.

1. Evaluate the following integrals.

(i) $\int\left(\sqrt{x}-\frac{1}{\sqrt{x}}\right)^2 dx$ (ii) $\int\frac{x^3+3x^2+4}{\sqrt{x}}dx$

(iii) $\int\frac{dx}{\sqrt{ax+b}-\sqrt{ax+c}}$ (iv) $\int\frac{x^3+3x^2+2x+1}{x-1}dx$

(v) $\int cos^3\ x\ dx$ (vi) $\int(tan\ x+cot\ x)^2\ dx$

2. Evaluate the following integrals.

(i) $\int sin\ x\ \sqrt{1-\cos 2x}\ dx$ (ii) $\int\left(e^{a\ log\ x}+e^{x\ log\ a}\right)dx$

(iii) $\int cos\ x\ cos\ 2x\ cos 3x\ dx$ (iv) $\int(1+x)\sqrt{1-x}\ dx$

3. Evaluate the following integrals.

(i) $\int\frac{2x-3}{\sqrt{2x+1}}dx$ (ii) $\int\frac{sinx+cosx}{\sqrt{1+sin2x}}dx$ (iii) $\int sin\ x\ cos\ x\ (sin2x+cos2x)\ dx$

(iv) $\int\frac{sin^2\ x}{(1+cos\ x)^2}dx$ (v) $\int\frac{1}{1-sin\ x}dx$ (vi) $\int\frac{1}{1-cosx}dx$

4. Evaluate the following integrals.

(i) $\int\frac{dx}{e^x+e^{-x}}$ (ii) $\int\frac{x^5}{(1-x^3)^2}dx$

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

(v) $\int\frac{\sin x+\cos x}{(\sin x-\cos x)^3}dx$ (vi) $\int\frac{x\ dx}{(ax^2+b)^p}$

5. Evaluate the following integrals.

(i) $\int\frac{\cos^3 x}{\sqrt{\sin x}}dx$ (ii) $\int\cos x\ \tan^3 x\ dx$

(iii) $\int\tan x\ \sec^6 x\ dx$ (iv) $\int\tan^3 x\ \sec^5 x\ dx$

(v) $\int\frac{dx}{x\cos^2(\log x)}$ (vi) $\int\frac{x^3dx}{(x^2-a^2)^{3/2}}$

6. $\int \frac{e^x}{e^x + e^{-x}}\, dx$

7. $\int \frac{1}{\sin(x-a)\sin(x-b)}\, dx$

8. $\int [1 + 2\tan x\,(\tan x + \sec x)]^{1/2}\, dx$

9. $\int \frac{1}{\cos(x-a)\cos(x-b)}\, dx$

10. $\int \frac{1}{\sqrt{(x+a)} + \sqrt{x+b}}\, dx$

11. $\int \frac{x}{\sqrt{x+a} + \sqrt{x+b}}\, dx$

12. $\int \sec^2 x\ \mathrm{cosec}^2 x\ dx$

13. $\int \frac{\sin x}{\sin(x-a)}\, dx$

14. $\int \tan(x-\alpha)\tan(x+\alpha)\tan 2x\, dx$ is equal to:

(A) $\log\left|\frac{\sqrt{\sec 2x}\ .\ \sec(x+\alpha)}{\sec(x-\alpha)}\right| + C$ **(B)** $\log\left|\frac{\sqrt{\sec 2x}}{\sec(x-\alpha)\,.\,\sec(x+\alpha)}\right| + C$

(C) $\log\left|\frac{\sqrt{\sec 2x}\ .\ \sec(x-\alpha)}{\sec(x+\alpha)}\right| + C$ **(D)** None of these

15. $\int \frac{d(\cos\theta)}{\sqrt{1-\cos^2\theta}}$

(A) $\cos^{-1}\theta + c$ **(B)** $\theta + c$ **(C)** $\sin^{-1}\theta + c$ **(D)** None of these