

Integral Calculus - 1

Date Planned : ___ / ___ / ___	Daily Tutorial Sheet - 14	Expected Duration : 90 Min
Actual Date of Attempt : ___ / ___ / ___	Level - 3	Exact Duration : _____

- 162. (i)** $\int \frac{e^x(x-1)(x-\ln x)}{x^2} dx$ is equal to:
- (A) $e^x \left(\frac{x - \ln x}{x} \right) + c$ (B) $e^x \left(\frac{x - \ln x + 1}{x} \right) + c$
 (C) $e^x \left(\frac{x - \ln x}{x^2} \right) + c$ (D) $e^x \left(\frac{x - \ln x - 1}{x} \right) + c$
- (ii)** $\int \frac{x^m - 1}{x^{m+1} \sqrt{1 - 2x^m + mx^{2m}}} dx = \frac{f(x)}{mx^m} + c$ where $f(x)$ is equal to:
- (A) $\sqrt{1 - 2x^m + mx^{2m}}$ (B) $\sqrt{1 - x^m + x^{2m}}$
 (C) $\sqrt{x^m + \frac{1}{x^m}}$ (D) $\sqrt{x^{2m} + \frac{1}{x^{2m}}}$
- 163. (i)** $\int (\sin(101x) \cdot \sin^{99} x) dx$ equals:
- (A) $\frac{\sin(100x)(\sin x)^{100}}{100} + C$ (B) $\frac{\cos(100x)(\sin x)^{100}}{100} + C$
 (C) $\frac{\cos(100x)(\cos x)^{100}}{100} + C$ (D) $\frac{\cos(100x)(\cos x)^{100}}{100} + C$
- (ii)** $\int \frac{a + b \sin x}{(b + a \sin x)^2} dx$ equals:
- (A) $-\left(\frac{a \cos x}{b + a \sin x} \right) + c$ (B) $-\left(\frac{\sin x}{a + b \cos x} \right) + c$
 (C) $\frac{\cos x}{b + a \sin x} + c$ (D) $\frac{\sin x}{a + b \cos x} + c$
- 164.** If $I_n = \int (\sin x + \cos x)^n dx$ ($n \geq 2$), then $nI_n - 2(n-1)I_{n-2}$ is equal to:
- (A) $(\sin x + \cos x)^n (\sin x - \cos x)$ (B) $(\sin x + \cos x)^{n-1} (\sin x - \cos x)$
 (C) $(\sin x + \cos x)^{n+1} (\sin x - \cos x)$ (D) $(\sin x - \cos x)^{n-1} (\sin x + \cos x)$
- 165.** $\int \frac{\operatorname{cosec}^2 x - 2005}{\cos^{2005} x} dx$ is equal to :
- (A) $\frac{\cot x}{(\cos x)^{2005}} + c$ (B) $\frac{\tan x}{(\cos x)^{2005}} + c$ (C) $\frac{-(\tan x)}{(\cos x)^{2005}} + c$ (D) none of these
- 166.** Evaluate $\int \frac{(1 - x \sin x) dx}{x(1 - x^3 e^{3 \cos x})}$.
- 167.** Evaluate $\int \frac{x^2 - 1}{x \sqrt{(x^2 + \alpha x + 1)(x^2 + \beta x + 1)}} dx$.