

Integral Calculus - 1

Date Planned : __ / __ / __	Daily Tutorial Sheet
Actual Date of Attempt : __ / __ / __	Level - 0

EVALUATE THE FOLLOWING INTEGRALS:

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|--|---|--|
| 1. $\int \frac{2x-1}{2x+3} dx$ | 2. $\int \frac{2x+3}{x^2+3x} dx$ | 3. $\int \frac{(x^2+2)}{x+1} dx$ |
| 4. $\int \frac{e^{6 \log x} - e^{5 \log x}}{e^{4 \log x} - e^{3 \log x}} dx$ | 5. $\int \frac{(1+\cos x)}{x+\sin x} dx$ | 6. $\int \frac{dx}{1+\cos x}$ |
| 7. $\int \tan^2 x \sec^4 x dx$ | 8. $\int \frac{\sin x + \cos x}{\sqrt{1+\sin 2x}} dx$ | 9. $\int \sqrt{1+\sin x} dx$ |
| 10. $\int \frac{x}{\sqrt{x+1}} dx$ | 11. $\int \sqrt{\frac{a+x}{a-x}} dx$ | 12. $\int \frac{x^{1/2}}{1+x^{3/4}} dx$ |
| 13. $\int \frac{\sqrt{1+x^2}}{x^4} dx$ | 14. $\int \frac{dx}{\sqrt{16-9x^2}}$ | 15. $\int \frac{dt}{\sqrt{3t-2t^2}}$ |
| 16. $\int \frac{3x-1}{\sqrt{x^2+9}} dx$ | 17. $\int \sqrt{5-2x-x^2} dx$ | 18. $\int \frac{x}{x^4-1} dx$ |
| 19. $\int \frac{x^2}{1-x^4} dx$ | 20. $\int \sqrt{2ax-x^2} dx$ | 21. $\int \frac{\sin^{-1} x}{(1-x^2)^{3/4}} dx$ |
| 22. $\int \frac{(\cos 5x + \cos 4x)}{1-2 \cos 3x} dx$ | 23. $\int \frac{\sin^6 x + \cos^6 x}{\sin^2 x \cos^2 x} dx$ | 24. $\int \frac{\sqrt{x}}{\sqrt{a^3-x^3}} dx$ |
| 25. $\int \frac{\cos x - \cos 2x}{1-\cos x} dx$ | 26. $\int \frac{dx}{x\sqrt{x^4-1}}$ | 27. $\int \frac{x^2}{x^4-x^2-12} dx$ |
| 28. $\int \frac{x^2}{(x^2+a^2)(x^2+b^2)} dx$ | 29. $\int \frac{2x-1}{(x-1)(x+2)(x-3)} dx$ | 30. $\int e^{\tan^{-1} x} \left(\frac{1+x+x^2}{1+x^2} \right) dx$ |
| 31. $\int \sin^{-1} \sqrt{\frac{x}{a+x}} dx$ | 32. $\int e^{-3x} \cos^3 x dx$ | 33. $\int \sqrt{\tan x} dx$ |
| 34. $\int \frac{\cos 2x - \cos 2\theta}{\cos x - \cos \theta} dx$ is equal to :
<div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p>(A) $2(\sin x + x \cos \theta) + C$</p> <p>(C) $2(\sin x + 2x \cos \theta) + C$</p> </div> <div style="width: 48%;"> <p>(B) $2(\sin x - x \cos \theta) + C$</p> <p>(D) $2(\sin x - 2x \cos \theta) + C$</p> </div> </div> | | |

35. $\frac{dx}{\sin(x-a)\sin(x-b)}$ is equal to :
- (A) $\sin(b-a) \log \left| \frac{\sin(x-b)}{\sin(x-a)} \right| + C$ (B) $\operatorname{cosec}(b-a) \log \left| \frac{\sin(x-a)}{\sin(x-b)} \right| + C$
- (C) $\operatorname{cosec}(b-a) \log \left| \frac{\sin(x-b)}{\sin(x-a)} \right| + C$ (D) $\sin(b-a) \log \left| \frac{\sin(x-a)}{\sin(x-b)} \right| + C$
36. $\int \tan^{-1} \sqrt{x} dx$ is equal to :
- (A) $(x+1) \tan^{-1} \sqrt{x} - \sqrt{x} + C$ (B) $x \tan^{-1} \sqrt{x} - \sqrt{x} + C$
- (C) $\sqrt{x} - x \tan^{-1} \sqrt{x} + C$ (D) $\sqrt{x} - (x+1) \tan^{-1} \sqrt{x} + C$
37. $\int \frac{x^9}{(4x^2+1)^6} dx$ is equal to:
- (A) $\frac{1}{5x} \left(4 + \frac{1}{x^2} \right)^{-5} + C$ (B) $\frac{1}{5} \left(4 + \frac{1}{x^2} \right)^{-5} + C$ (C) $\frac{1}{10} \left(\frac{1}{x^2} + 4 \right)^{-5} + C$ (D) None of these
38. If $\int \frac{dx}{(x+2)(x^2+1)} = a \log|1+x^2| + b \tan^{-1} x + \frac{1}{5} \log|x+2| + C$, then:
- (A) $a = \frac{-1}{10}, b = \frac{-2}{5}$ (B) $a = \frac{1}{10}, b = -\frac{2}{5}$ (C) $a = \frac{-1}{10}, b = \frac{2}{5}$ (D) $a = \frac{1}{10}, b = \frac{2}{5}$
39. $\int \frac{x^3}{x+1} dx$ is equal to :
- (A) $x + \frac{x^2}{2} + \frac{x^3}{3} - \log|1-x| + C$ (B) $x + \frac{x^2}{2} - \frac{x^3}{3} - \log|1-x| + C$
- (C) $x - \frac{x^2}{2} - \frac{x^3}{3} - \log|1+x| + C$ (D) $x - \frac{x^2}{2} + \frac{x^3}{3} - \log|1+x| + C$
40. $\int \frac{x + \sin x}{1 + \cos x} dx$ is equal to :
- (A) $\log|1 + \cos x| + C$ (B) $\log|x + \sin x| + C$ (C) $x - \tan \frac{x}{2} + C$ (D) $x \cdot \tan \frac{x}{2} + C$
41. If $\frac{x^3 dx}{\sqrt{1+x^2}} = a(1+x^2)^{3/2} + b\sqrt{1+x^2} + C$, then:
- (A) $a = \frac{1}{3}, b = 1$ (B) $a = \frac{-1}{3}, b = 1$ (C) $a = \frac{-1}{3}, b = -1$ (D) $a = \frac{1}{3}, b = -1$
42. $\int \frac{x+3}{(x+4)^2} e^x dx$ is equal to:
- (A) $e^x \left(\frac{1}{x+4} \right) + C$ (B) $e^{-x} \left(\frac{1}{x+4} \right) + C$ (C) $e^{-x} \left(\frac{1}{x-4} \right) + C$ (D) $e^{2x} \left(\frac{1}{x-4} \right) + C$