

Career Makers

Assignment

+2 class

It's all about believing
Topic:- Definite Integrations

1. $\int_{-6}^6 |x+2| dx$ 2. $\int_2^8 |x-5| dx$ 3. $\int_0^\pi |\cos x| dx$ 4. $\int_{-\pi/4}^{\pi/4} |\sin x| dx$ 5. $\int_{-2}^2 |2x+3| dx$
6. $\int_{-2}^2 |x+1| dx$ 7. $\int_{-1}^1 \sqrt{|x|-1} dx$ 8. $\int_0^2 |x^2+2x-3| dx$ 9. $\int_1^3 |x^2-2x| dx$
10. $\int_1^4 f(x) dx$ where $f(x) = \begin{cases} 7x+3 & \text{if } 1 \leq x \leq 3 \\ 8x & \text{if } 3 \leq x \leq 4 \end{cases}$
11. $\int_0^9 f(x) dx$, where $f(x) = \begin{cases} \sin x & \text{if } 0 \leq x \leq \pi/2 \\ 1 & \text{if } \frac{\pi}{2} \leq x \leq 3 \\ e^{x-3} & \text{if } 3 \leq x \leq 9 \end{cases}$
12. $\int_0^2 x\sqrt{2-x} dx$ 13. $\int_0^1 x(1-x)^n dx$ 14. $\int_{-\pi/4}^{\pi/4} \sin^2 x dx$ 15. $\int_{-\pi/2}^{\pi/2} \sin^7 x dx$
16. $\int_{-\pi/2}^{\pi/2} \cos^2 x dx$ 17. $\int_0^{\pi/2} \log \tan x dx$ 18. $\int_0^1 \frac{\log(1+x)}{1+x^2} dx$ 19. $\int_0^1 \log \left\{ \frac{1}{x} - 1 \right\} dx$
20. $\int_0^{\pi/2} (2 \log \sin x - \log \sin 2x) dx$ 21. $\int_0^{\pi/2} \frac{\sin^2 x}{\sin x + \cos x} dx$ 22. $\int_0^\pi \frac{x}{1 + \sin x} dx$ 23. $\int_0^{\pi/2} \frac{x}{\sin x + \cos x} dx$
24. $\int_0^\pi \frac{x \tan x}{\sec x + \tan x} dx$ 25. $\int_0^{\pi/2} \frac{x \tan x}{\sec x + \cos x} dx$ 26. $\int_0^\pi \frac{x}{1 + \cos^2 x} dx$ 27. $\int_0^{\pi/2} \frac{\sqrt{\tan x}}{1 + \sqrt{\tan x}} dx$
28. $\int_0^{\pi/2} \frac{1}{1 + \tan^3 x} dx$ 29. $\int_0^{\pi/2} \frac{\sin^2 x - \cos^2 x}{\sin^3 x + \cos^3 x} dx$ 30. $\int_0^\pi \frac{x \sin x}{1 + \sin x} dx$ 31. $\int_{-1}^1 e^{|x|} dx$ 32. $\int_0^{\pi/2} x \cot x dx$
33. $\int_0^\pi \frac{xdx}{a^2 \cos^2 x + b^2 \sin^2 x}$

Prove the following:

34. $\int_0^\pi \frac{x \tan x}{\sec x \cos ec x} dx = \frac{\pi^2}{4}$ 35. $\int_0^{\pi/2} \frac{x \sin x \cos x}{\cos^4 x + \sin^4 x} dx = \frac{\pi^2}{16}$
36. $\int_0^{\pi/2} \sin 2x \log \tan x dx = 0$ 37. $\int_0^{\pi/2} \log \sin x dx = \frac{-\pi}{2} \log 2$ 38. $\int_0^\infty \log \left(x + \frac{1}{x} \right) \frac{dx}{x^2 + 1} = \log 2$
39. $\int_0^\infty \frac{xdx}{(1+x)(1+x^2)} = \frac{\pi}{4}$ 40. $\int_0^\pi x \log \sin x dx = \frac{-\pi^2}{4} \log 2$ 41. $\int_0^1 \frac{\log x}{\sqrt{1-x^2}} dx = \frac{-\pi}{4} \log 2$
42. $\int_0^{2a} \frac{f(x)}{f(x) + f(2a-x)} dx = a$ 43. $\int_{-\sqrt{2}}^{\sqrt{2}} \cos x \log \left(\frac{1+x}{1-x} \right) dx = a$ 44. $\int_{-\pi/2}^{\pi/2} \{f(x) + f(-x)\} \{g(x) - g(-x)\} dx = 0$,
- where f, g are real valued continuous functions. 45. $\int_0^a \frac{dx}{x + \sqrt{a^2 - x^2}} = \frac{\pi}{4}$ 46. $\int_{-\pi}^\pi x^{10} \sin^7 x dx = 0$

47. $\int_{-99}^{99} (x^{99} + x^{49} + x^{19}) dx = 0$ 48. $\int_{-\pi/4}^{\pi/4} x^3 \sin^4 x dx = 0$

Evaluate the following integrals :-

49. $\int_1^4 (|x-1| + |x-2| + |x-3|) dx$ 50. $\int_{-1}^{3/2} |x \sin \pi x| dx$
51. $\int_0^{\pi/2} \sin 2x \tan^{-1}(\sin x) dx$ 52. $\int_{\pi/6}^{\pi/3} \frac{1}{1 + \sqrt{\tan x}} dx$

Answer

1. 40 2. 9 3. 2 4. $2 - \sqrt{2}$ 5. $\frac{25}{2}$ 6. 5 7. $\frac{2\sqrt{2}}{3}$ 8. 4 9. 2 10. 62 11. $e^6 \cdot \frac{\pi}{2} + 3$ 12. $\frac{16}{15} \sqrt{2}$
13. $\frac{1}{(n+1)(n+2)}$ 14. $\frac{\pi}{4} - \frac{1}{2}$ 15. 0 16. $\frac{\pi}{2}$ 17. 0 18. $\frac{\pi}{8} \log 2$ 19. 0 20. $\frac{-\pi}{4} \log 2$
21. $\frac{1}{\sqrt{2}} \log(\sqrt{2} + 1)$ 22. π 23. $\frac{\pi}{2\sqrt{2}} \log(\sqrt{2} + 1)$ 24. $\frac{\pi}{2} (\pi - 2)$ 25. $\frac{\pi^2}{4}$ 26. $\frac{\pi^2}{2\sqrt{2}}$ 27.

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$$\pi \left(\frac{\pi}{2} - 1 \right) \quad 28. \frac{\pi}{4} \quad 29. 0 \quad 30. \frac{\pi}{2} (\pi - 2) \quad 31. 2(e - 1) \quad 32. \frac{\pi}{2} \log 2 \quad 33. \frac{\pi^2}{2ab} \quad 49. \frac{19}{2} \quad 50. \frac{3\pi + 1}{\pi^2} \quad 51. \left(\frac{\pi}{2} - 1 \right) \quad 52. \frac{\pi}{12}$$

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