

1 Integration

Evaluate the integral.

1. $\int_1^4 (1 + \sqrt{x})^2 dx$
2. $\int_0^2 (x^2 - x) dx$
3. $\int \frac{(x^{-1} + x)^2}{x^2} dx$
4. $\int_0^2 x^2 dx$
5. $\int \frac{x^3 - 3x + 5}{\sqrt[3]{x}} dx$
6. $\int_{-2}^0 (x^2 - 4)^2 dx$
7. $\int \left(10x^4 - \frac{1}{x^3} + 15\sqrt{x^3} - 7 \right) dx$
8. $\int_1^2 \left(2x^3 + \frac{5}{x^4} \right) dx$
9. $\int \frac{(2x + 1)(x - 1)}{\sqrt{x}} dx$
10. $\int \frac{3x^5 + 6}{2x^3} dx$
11. $\int_0^1 (2t + 3t^2) dt$
12. $\int_1^9 (x + \sqrt{x}) dx$
13. $\int_1^8 \left(6x^2 - \sqrt[3]{x} + \frac{2}{x^3} \right) dx$
14. $\int \left(2\sqrt{x} - \frac{1}{x^2} + e^x \right) dx$
15. $\int \left[\left(\frac{1}{x} \right)^3 + \left(\frac{1}{x} \right)^2 - \left(\frac{1}{x} \right) \right] dx$
16. $\int \frac{3x^2 - 2x + 5}{\sqrt[4]{x}} dx$
17. $\int (2x^3 - 1)(x^2 + 5) dx$
18. $\int \frac{(3x - 2)^2}{4x} dx$
19. $\int \left(\frac{3}{\sqrt[3]{x}} - \frac{2}{x^3} + \frac{1}{3x} \right) dx$
20. $\int_1^2 (2x^2 + x - 1) dx$
21. $\int \frac{2y^4 + 1}{3y^3} dy$
22. $\int \left(\sqrt{x} + 1 - \frac{1}{x} + \frac{1}{x^2} + \sin x - e^x \right) dx$
23. $\int \left(x + 2\sqrt{x} + 1 + \frac{4}{\sqrt{x}} \right) dx$
24. $\int \tan^2 x dx$
25. $\int \frac{\sin x}{\cos^2 x} dx$
26. $\int_0^{\pi/4} \sec^2 x dx$
27. $\int_0^{\pi} \sin x dx$
28. $\int_0^{\pi} \cos x dx$
29. $\int \frac{1}{1 + \sin x} dx$
30. $\int \frac{\cot x}{\sin x} dx$
31. $\int \frac{\pi}{\sec x} dx$
32. $\int \frac{3}{1 - \cos^2 x} dx$
33. $\int \frac{-1}{\cos^2 x} dx$

Answers:

1. $\frac{119}{6}$
2. $\frac{2}{3}$
3. $-\frac{1}{3x^3} - \frac{2}{x} + x + C$
4. $\frac{8}{3}$
5. $\frac{3}{11}x^{11/3} - \frac{9}{5}x^{5/3} + \frac{15}{2}x^{2/3} + C$
6. $\frac{256}{15}$
7. $2x^5 + \frac{1}{2x^2} + 6x^{5/2} - 7x + C$
8. $\frac{215}{24}$
9. $\frac{4x^{5/2}}{5} - \frac{2x^{3/2}}{3} - 2\sqrt{x} + C$
10. $\frac{x^3}{2} - \frac{3}{2x^2} + C$
11. 2
12. $\frac{172}{3}$
13. $\frac{64751}{64}$
14. $\frac{4x^{3/2}}{3} + \frac{1}{x} + e^x + C$
15. $-\frac{1}{2x^2} - \frac{1}{x} - \ln|x| + C$
16. $\frac{12x^{11/4}}{11} - \frac{8x^{7/4}}{7} + \frac{20x^{3/4}}{3} + C$
17. $\frac{x^6}{3} + \frac{5x^4}{2} - \frac{x^3}{3} - 5x + C$
18. $\frac{9x^2}{8} - 3x + \ln|x| + C$
19. $\frac{9x^{2/3}}{2} + \frac{1}{x^2} + \frac{\ln|x|}{3} + C$
20. $\frac{31}{6}$
21. $\frac{1}{3}y^2 - \frac{1}{6y^2} + C$
22. $\frac{2}{3}x^{3/2} + x - \ln|x| - \frac{1}{x} - \cos x - e^x + C$
23. $\frac{x^2}{2} + \frac{4}{3}x^{3/2} + x + 8\sqrt{x} + C$
24. $\tan x - x + C$
25. $\sec x + C$
26. 1
27. 2
28. 0
29. $\tan x - \sec x + C$ [HINT: Multiply numerator and denominator by $1 - \sin x$.]
30. $-\csc x + C$
31. $\pi \sin x + C$
32. $-3 \cot x + C$
33. $-\tan x + C$