

6.4 Exercícios

Calcular as integrais seguintes usando o método da substituição.

1. $\int (2x^2 + 2x - 3)^{10} (2x + 1) dx$

2. $\int (x^3 - 2)^{1/7} x^2 dx$

3. $\int \frac{x dx}{\sqrt[5]{x^2 - 1}}$

4. $\int 5x \sqrt{4 - 3x^2} dx$

5. $\int \sqrt{x^2 + 2x^4} dx$

6. $\int (e^{2t} + 2)^{1/3} e^{2t} dt$

7. $\int \frac{e^t dt}{e^t + 4}$

8. $\int \frac{e^{1/x} + 2}{x^2} dx$

9. $\int \operatorname{tg} x \sec^2 x dx$

10. $\int \sin^4 x \cos x dx$

11. $\int \frac{\operatorname{sen} x}{\cos^5 x} dx$

12. $\int \frac{2 \operatorname{sen} x - 5 \cos x}{\cos x} dx$

13. $\int e^x \cos 2e^x dx$

14. $\int \frac{x}{2} \cos x^2 dx$

15. $\int \operatorname{sen}(5\theta - \pi) d\theta$

16. $\int \frac{\operatorname{arc} \operatorname{sen} y}{2\sqrt{1 - y^2}} dy$

17. $\int \frac{2 \sec^2 \theta}{a + b \operatorname{tg} \theta} d\theta$

18. $\int \frac{dx}{16 + x^2}$

19. $\int \frac{dy}{y^2 - 4y + 4}$

20. $\int \sqrt[3]{\operatorname{sen} \theta \cos \theta} d\theta$

21. $\int \frac{\ln x^2}{x} dx$

22. $\int (e^{ax} + e^{-ax})^2 dx$

23. $\int \sqrt{3t^4 + t^2} dt$

24. $\int \frac{4dx}{4x^2 + 20x + 34}$

25. $\int \frac{3 dx}{x^2 - 4x + 1}$

27. $\int \frac{\sqrt{x+3}}{x-1} dx$

29. $\int (\text{sen } 4x + \cos 2\pi) dx$

31. $\int x e^{3x^2} dx$

33. $\int \frac{dt}{t \ln t}$

35. $\int (e^{2x} + 2)^5 e^{2x} dx$

37. $\int \frac{\cos x}{3 - \text{sen } x} dx$

39. $\int x^2 \sqrt{1+x} dx$

41. $\int t \cos t^2 dt$

43. $\int \text{sen}^{1/2} 2\theta \cos 2\theta d\theta$

45. $\int \frac{\text{sen } \theta d\theta}{(5 - \cos \theta)^3}$

47. $\int (1 + e^{-at})^{3/2} e^{-at} dt, a > 0$

49. $\int t \sqrt{t-4} dt$

26. $\int \frac{e^x dx}{e^{2x} + 16}$

28. $\int \frac{3 dx}{x \ln^2 3x}$

30. $\int 2^{x^2+1} x dx$

32. $\int \frac{dt}{(2+t)^2}$

34. $\int 8x \sqrt{1-2x^2} dx$

36. $\int \frac{4t dt}{\sqrt{4t^2+5}}$

38. $\int \frac{dv}{\sqrt{v}(1+\sqrt{v})^5}$

40. $\int x^4 e^{-x^3} dx$

42. $\int 8x^2 \sqrt{6x^3+5} dx$

44. $\int \sec^2(5x+3) dx$

46. $\int \cotg u du$

48. $\int \frac{\cos \sqrt{x}}{\sqrt{x}} dx$

50. $\int x^2 (\text{sen } 2x^3 + 4x) dx$

Gabarito

Seção 6.4

1. $\frac{1}{22}(2x^2 + 2x + 3)^{11} + c$
2. $\frac{7}{24}(x^3 - 2)^{8/7} + c$
3. $\frac{5}{8}(x^2 - 1)^{4/5} + c$
4. $\frac{-5}{9}(4 - 3x^2)^{3/2} + c$
5. $\frac{1}{6}(1 + 2x^2)^{3/2} + c$
6. $\frac{3}{8}(e^{2x} + 2)^{4/3} + c$
7. $\ln(e^x + 4) + c$
8. $-e^{1/x} - \frac{2}{x} + c$
9. $\frac{\operatorname{tg}^2 x}{2} + c$
10. $\frac{\operatorname{sen}^5 x}{5} + c$
11. $\frac{1}{4}\sec^4 x + c$
12. $-2 \ln |\cos x| - 5x + c$
13. $\frac{1}{2} \operatorname{sen} 2e^x + c$
14. $\frac{1}{4} \operatorname{sen} x^2 + c$
15. $\frac{-1}{5} \cos(5\theta - \pi) + c$
16. $\frac{1}{4}(\operatorname{arcsen} y)^2 + c$
17. $\frac{2}{b} \ln |a + b \operatorname{tg} \theta| + c$
18. $\frac{1}{4} \operatorname{arc} \operatorname{tg} \frac{x}{4} + c$
19. $\frac{1}{2-y} + c$
20. $\frac{3}{4} \operatorname{sen}^{4/3} \theta + c$
21. $(\ln x)^2 + c$
22. $\frac{\operatorname{senh} 2ax}{a} + 2x + c$
23. $\frac{1}{9}(3t^2 + 1)^{3/2} + c$
24. $\frac{2}{3} \operatorname{arc} \operatorname{tg} \frac{2(x + 5/2)}{3} + c$
25. $\frac{-\sqrt{3}}{2} \ln \left| \frac{x + \sqrt{3} - 2}{\sqrt{3} + 2 - x} \right| + c$
26. $\frac{1}{4} \operatorname{arc} \operatorname{tg} \frac{e^x}{4} + c$
27. $2\sqrt{x+3} - 2 \ln \left| \frac{2 + \sqrt{x+3}}{2 - \sqrt{x+3}} \right| + c$
28. $\frac{-3}{\ln 3x} + c$
29. $\frac{-1}{4} \cos 4x + x + c$
30. $\frac{2x^2}{\ln 2} + c$
31. $\frac{1}{6} e^{3x^2} + c$
32. $\frac{-1}{2+t} + c$
33. $\ln |\ln t| + c$
34. $\frac{-4}{3}(1 - 2x^2)^{3/2} + c$

35. $\frac{1}{12}(e^{2x} + 2)^6 + c$

36. $\sqrt{4t^2 + 5} + c$

37. $-\ln|3 - \sin x| + c$

38. $\frac{-1}{2(1 + \sqrt{v})^4} + c$

39. $\frac{2}{7}(1+x)^3\sqrt{1+x} - \frac{4}{5}(1+x)^2\sqrt{1+x} + \frac{2}{3}(1+x)\sqrt{1+x} + c$

40. $\frac{-1}{5}e^{-x^5} + c$

41. $\frac{1}{2}\sin t^2 + c$

42. $\frac{8}{27}(6x^3 + 5)^{3/2} + c$

43. $\frac{1}{3}(\sin 2\theta)^{3/2} + c$

44. $\frac{1}{5}\operatorname{tg}(5x + 3) + c$

45. $\frac{-1}{2(5 - \cos\theta)^2} + c$

46. $\ln|\sin u| + c$

47. $-\frac{2}{5a}(1 + e^{-a})^{5/2} + c$

48. $2\sin\sqrt{x} + c$

49. $\frac{2}{5}(t-4)^2\sqrt{t-4} + \frac{8}{3}(t-4)\sqrt{t-4} + c$

50. $\frac{-1}{6}\cos 2x^3 + x^4 + c$