

Então,

$$\begin{aligned}\int \sin^3 x \, dx &= \sin^2 x \cdot (-\cos x) - \int -\cos x \cdot 2 \sin x \cos x \, dx \\ &= -\sin^2 x \cos x + 2 \int \cos^2 x \sin x \, dx \\ &= -\sin^2 x \cos x - 2 \frac{\cos^3 x}{3} + c.\end{aligned}$$

6.6 EXERCÍCIOS

Resolver as seguintes integrais usando a técnica de integração por partes.

1. $\int x \sin 5x \, dx$
2. $\int \ln(1-x) \, dx$
3. $\int t e^{4t} \, dt$
4. $\int (x+1) \cos 2x \, dx$
5. $\int x \ln 3x \, dx$
6. $\int \cos^3 x \, dx$
7. $\int e^x \cos \frac{x}{2} \, dx$
8. $\int \sqrt{x} \ln x \, dx$
9. $\int \operatorname{cosec}^3 x \, dx$
10. $\int x^2 \cos ax \, dx$
11. $\int x \operatorname{cosec}^2 x \, dx$
12. $\int \operatorname{arc cotg} 2x \, dx$

13. $\int e^{ax} \sin bx \, dx$
14. $\int \frac{\ln(ax+b)}{\sqrt{ax+b}} \, dx$
15. $\int x^3 \sqrt{1-x^2} \, dx$
16. $\int \ln^3 2x \, dx$
17. $\int \operatorname{arc tg} ax \, dx$
18. $\int x^3 \sin 4x \, dx$
19. $\int (x-1)e^{-x} \, dx$
20. $\int x^2 \ln x \, dx$
21. $\int x^2 e^x \, dx$
22. $\int \operatorname{arc sen} \frac{x}{2} \, dx$
23. $\int (x-1) \sec^2 x \, dx$
24. $\int e^{3x} \cos 4x \, dx$
25. $\int x^n \ln x \, dx, \quad n \in \mathbb{N}$
26. $\int \ln(x^2+1) \, dx$
27. $\int \ln(x+\sqrt{1+x^2}) \, dx$
28. $\int x \operatorname{arc tg} x \, dx$
29. $\int x^5 e^{x^2} \, dx$
30. $\int x \cos^2 x \, dx$
31. $\int (x+3)^2 e^x \, dx$
32. $\int x \sqrt{x+1} \, dx$
33. $\int \cos(\ln x) \, dx$
34. $\int \operatorname{arc cos} x \, dx$
35. $\int \sec^3 x \, dx$
36. $\int \frac{1}{x^3} e^{1/x} \, dx$

SEÇÃO 6.6

1. $-\frac{x}{5} \cos 5x + \frac{1}{25} \operatorname{sen} 5x + c$
2. $(x-1) \ln (1-x) - x + c$
3. $\frac{e^{4t}}{4} \left(t - \frac{1}{4} \right) + c$
4. $\frac{(x+1)}{2} \operatorname{sen} 2x + \frac{1}{4} \cos 2x + c$
5. $\frac{x^2}{2} \left[\ln 3x - \frac{1}{2} \right] + c$
6. $\cos^2 x \operatorname{sen} x + \frac{2 \operatorname{sen}^3 x}{3} + c$
7. $\frac{2}{5} e^x \left[\operatorname{sen} \frac{x}{2} + 2 \cos \frac{x}{2} \right] + c$
8. $\frac{2}{3} x \sqrt{x} \ln x - \frac{4}{9} x \sqrt{x} + c$
9. $-\frac{1}{2} \operatorname{cosec} x \operatorname{cotg} x + \frac{1}{2} \ln |\operatorname{cosec} x - \operatorname{cotg} x| + c$
10. $\frac{x^2}{a} \operatorname{sen} ax + \frac{2x}{a^2} \cos ax - \frac{2}{a^3} \operatorname{sen} ax + c$
11. $-x \operatorname{cotg} x + \ln |\operatorname{sen} x| + c$
12. $x \operatorname{arc} \operatorname{cotg} 2x + \frac{1}{4} \ln (1+4x^2) + c$
13. $\frac{b e^{ax}}{a^2 + b^2} \left[-\cos bx + \frac{a}{b} \operatorname{sen} bx \right] + c$
14. $\frac{2}{a} \sqrt{ax+b} [\ln (ax+b) - 2] + c$
15. $-\frac{x^2}{3} (1-x^2) \sqrt{1-x^2} - \frac{2}{15} (1-x^2)^2 \sqrt{1-x^2} + c$
16. $x [\ln^3 2x - 3 \ln^2 2x + 6 \ln 2x - 6] + c$
17. $x \operatorname{arc} \operatorname{tg} ax - \frac{1}{2a} \ln (1+a^2 x^2) + c$
18. $-\frac{x^3}{4} \cos 4x + \frac{3}{16} x^2 \operatorname{sen} 4x + \frac{3x}{32} \cos 4x - \frac{3}{128} \operatorname{sen} 4x + c$
19. $-x e^{-x} + c$
20. $\frac{x^3}{3} \left[\ln x - \frac{1}{3} \right] + c$
21. $e^x [x^2 - 2x + 2] + c$
22. $x \operatorname{arc} \operatorname{sen} \frac{x}{2} + \sqrt{4-x^2} + c$
23. $(x-1) \operatorname{tg} x + \ln |\cos x| + c$
24. $\frac{4}{25} \left[e^{3x} \operatorname{sen} 4x + \frac{3}{4} e^{3x} \cos 4x \right] + c$
25. $\frac{x^{n+1}}{n+1} \left[\ln x - \frac{1}{n+1} \right] + c$
26. $x \ln (x^2+1) - 2x + 2 \operatorname{arc} \operatorname{tg} x + c$
27. $x \ln (x + \sqrt{1+x^2}) - \sqrt{1+x^2} + c$
28. $\frac{x^2}{2} \operatorname{arc} \operatorname{tg} x - \frac{1}{2} x + \frac{1}{2} \operatorname{arc} \operatorname{tg} x + c$
29. $e^{x^2} \left[\frac{x^4}{4} - x^2 + 1 \right] + c$
30. $\frac{1}{4} \left[x^2 + x \operatorname{sen} 2x + \frac{1}{2} \cos 2x \right] + c$
31. $e^x [x^2 + 4x + 5] + c$
32. $\frac{2}{3} x (x+1) \sqrt{x+1} - \frac{4}{15} (x+1)^2 \sqrt{x+1} + c$
33. $\frac{1}{2} x \cos (\ln x) + \frac{1}{2} x \operatorname{sen} (\ln x) + c$
34. $x \operatorname{arc} \cos x - \sqrt{1-x^2} + c$
35. $\frac{1}{2} [\sec x \operatorname{tg} x + \ln |\sec x + \operatorname{tg} x|] + c$
36. $-\frac{1}{x} e^{1/x} + e^{1/x} + c$