

Esercizi sulle tecniche d'integrazione

Ecco un'occasione per fare della pratica nel calcolo degli integrali. Diversamente dagli esercizi dei paragrafi 5.6 e 6.1-6.3, che si riferivano solo alle tecniche elaborate nel rispettivo paragrafo, gli esercizi che seguono sono distribuiti in modo casuale, per cui si deve scegliere quale tecnica utilizzare in ciascun caso.

1. $\int \frac{x \, dx}{2x^2 + 5x + 2}$
2. $\int \frac{x \, dx}{(x-1)^3}$
3. $\int \sin^3 x \cos^3 x \, dx$
4. $\int \frac{(1+\sqrt{x})^{1/3}}{\sqrt{x}} \, dx$
5. $\int \frac{3 \, dx}{4x^2 - 1}$
6. $\int (x^2 + x + 2) \sin(3x) \, dx$
7. $\int \frac{\sqrt{1-x^2}}{x^4} \, dx$
8. $\int x^3 \cos(x^2) \, dx$
9. $\int \frac{x^2 \, dx}{(5x^3 - 2)^{2/3}}$
10. $\int \frac{dx}{x^2 + 2x - 15}$
11. $\int \frac{dx}{(4+x^2)^2}$
12. $\int (\sin x + \cos x)^2 \, dx$
13. $\int 2^x \sqrt{1+4^x} \, dx$
14. $\int \frac{\cos x}{1 + \sin^2 x} \, dx$
15. $\int \frac{\sin^3 x}{\cos^7 x} \, dx$
16. $\int \frac{x^2 \, dx}{(3+5x^2)^{3/2}}$
17. $\int e^{-x} \sin(2x) \, dx$
18. $\int \frac{2x^2 + 4x - 3}{x^2 + 5x} \, dx$
19. $\int \cos(3 \ln x) \, dx$
20. $\int \frac{dx}{4x^3 + x}$
21. $\int \frac{x \ln(1+x^2)}{1+x^2} \, dx$
22. $\int \sin^2 x \cos^4 x \, dx$
23. $\int \frac{x^2}{\sqrt{2-x^2}} \, dx$
24. $\int \tan^4 x \sec x \, dx$
25. $\int \frac{x^2 \, dx}{(4x+1)^{10}}$
26. $\int x \sin^{-1} \frac{x}{2} \, dx$
27. $\int \sin^5(4x) \, dx$
28. $\int \frac{dx}{x^5 - 2x^3 + x}$
29. $\int \frac{dx}{2+e^x}$
30. $\int x^3 3^x \, dx$
31. $\int \frac{\sin^2 x \cos x}{2 - \sin x} \, dx$
32. $\int \frac{x^2 + 1}{x^2 + 2x + 2} \, dx$
33. $\int \frac{dx}{x^2 \sqrt{1-x^2}}$
34. $\int x^3 (\ln x)^2 \, dx$
35. $\int \frac{x^3}{\sqrt{1-4x^2}} \, dx$
36. $\int \frac{e^{1/x} \, dx}{x^2}$
37. $\int \frac{x+1}{\sqrt{x^2+1}} \, dx$
38. $\int e^{(x^{1/3})} \, dx$
39. $\int \frac{x^3 - 3}{x^3 - 9x} \, dx$
40. $\int \frac{10\sqrt{x+2}}{\sqrt{x+2}} \, dx$
41. $\int \sin^5 x \cos^9 x \, dx$
42. $\int \frac{x^2 \, dx}{\sqrt{x^2-1}}$
43. $\int \frac{x \, dx}{x^2 + 2x - 1}$
44. $\int \frac{2x-3}{\sqrt{4-3x+x^2}} \, dx$
45. $\int x^2 \sin^{-1}(2x) \, dx$
46. $\int \frac{\sqrt{3x^2-1}}{x} \, dx$
47. $\int \cos^4 x \sin^4 x \, dx$
48. $\int \sqrt{x-x^2} \, dx$
49. $\int \frac{dx}{(4+x)\sqrt{x}}$
50. $\int x \tan^{-1} \frac{x}{3} \, dx$
51. $\int \frac{x^4 - 1}{x^3 + 2x^2} \, dx$
52. $\int \frac{dx}{x(x^2+4)^2}$
53. $\int \frac{\sin(2 \ln x)}{x} \, dx$
54. $\int \frac{\sin(\ln x)}{x^2} \, dx$
55. $\int \frac{e^{2 \tan^{-1} x}}{1+x^2} \, dx$
56. $\int \frac{x^3 + x - 2}{x^2 - 7} \, dx$
57. $\int \frac{\ln(3+x^2)}{3+x^2} x \, dx$
58. $\int \cos^7 x \, dx$
59. $\int \frac{\sin^{-1}(x/2)}{(4-x^2)^{1/2}} \, dx$
60. $\int \tan^4(\pi x) \, dx$
61. $\int \frac{(x+1) \, dx}{\sqrt{x^2+6x+10}}$
62. $\int e^x (1-e^{2x})^{5/2} \, dx$
63. $\int \frac{x^3 \, dx}{(x^2+2)^{7/2}}$
64. $\int \frac{x^2}{2x^2-3} \, dx$
65. $\int \frac{x^{1/2}}{1+x^{1/3}} \, dx$
66. $\int \frac{dx}{x(x^2+x+1)^{1/2}}$
67. $\int \frac{1+x}{1+\sqrt{x}} \, dx$
68. $\int \frac{x \, dx}{4x^4+4x^2+5}$
69. $\int \frac{x \, dx}{(x^2-4)^2}$
70. $\int \frac{dx}{x^3+x^2+x}$
71. $\int x^2 \tan^{-1} x \, dx$
72. $\int e^x \sec(e^x) \, dx$
73. $\int \frac{dx}{4 \sin x - 3 \cos x}$
74. $\int \frac{dx}{x^{1/3}-1}$
75. $\int \frac{dx}{\tan x + \sin x}$
76. $\int \frac{x \, dx}{\sqrt{3-4x-4x^2}}$
77. $\int \frac{\sqrt{x}}{1+x} \, dx$
78. $\int \sqrt{1+e^x} \, dx$
79. $\int \frac{x^4 \, dx}{x^3-8}$
80. $\int x e^x \cos x \, dx$