

Integration Bee Practice Problems

Spring 2022

1. $\int (x^4 + 5x) \, dx$

2. $\int (1 + \sin t) \, dt$

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

4. $\int \sqrt[3]{t} \, dt$

5. $\int \sqrt{\frac{5}{x}} \, dx$

6. $\int (2 - t)\sqrt{t} \, dt$

7. $\int \left(\frac{\sqrt{x}}{2} - \frac{\sqrt{2}}{x} \right) \, dx$

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

9. $\int \frac{t\sqrt{t} + \sqrt{t}}{t^2} \, dt$

10. $\int e^{4x} \, dx$

11. $\int 7 \sin \left(\frac{\theta}{3} \right) \, d\theta$

12. $\int -3 \csc^2 x \, dx$

13. $\int \cos \theta (\tan \theta + \sec \theta) \, d\theta$

14. $\int (1 + \tan^2 \theta) \, d\theta$

15. $\int \frac{(t+1)^2 - 1}{t^4} \, dt$

16. $\int e^{\sin^2 x} e^{\cos^2 x} \, dx$

17. $\int \sqrt{4y-1} \, dy$

18. $\int \frac{\sin x}{1 - \sin^2 x} \, dx$

19. $\int \frac{3}{(2-x)^2} \, dx$

20. $\int \frac{\cos \theta}{\sin^2 \theta} \, d\theta$

21. $\int (3x+2)^4 \, dx$

22. $\int \sin^5 \left(\frac{x}{3} \right) \cos \left(\frac{x}{3} \right) \, dx$

23. $\int \tan^2 x \sec^2 x \, dx$

24. $\int \frac{\cos(\sqrt{x}+3)}{\sqrt{x}} \, dx$

$$25. \int x^2 \left(\frac{x^3}{18} - 1 \right)^5 dx$$

$$26. \int \frac{7x^9 - 3x^2 + 4}{2x^5} dx$$

$$27. \int \sqrt{\frac{x-1}{x^5}} dx$$

$$28. \int x(1-x)^{2015} dx$$

$$29. \int xe^{3x^2} dx$$

$$30. \int \frac{1}{2\sqrt{x}(1+\sqrt{x})^2} dx$$

$$31. \int u^3 \sqrt{u^4 + 2} du$$

$$32. \int \frac{6e^{1/x}}{x^2} dx$$

$$33. \int \frac{x}{\cos^2(x^2)} dx$$

$$34. \int \frac{\sin u}{(5 + 2 \cos u)^2} du$$

$$35. \int 2xe^{x^2} \cos(e^{x^2}) dx$$

$$36. \int \frac{5^{\tan \theta}}{\cos^2 \theta} d\theta$$

$$37. \int \frac{1}{\tan^2 x} dx$$

$$38. \int \frac{\csc x}{\csc x - \sin x} dx$$

$$39. \int \cos^6 x \sin^3 x dx$$

$$40. \int \sin^2 x dx$$

$$41. \int \frac{5}{3x-2} dx$$

$$42. \int \frac{\sec u \tan u}{4 - \sec u} du$$

$$43. \int \frac{1}{x(\ln x)^2} dx$$

$$44. \int \frac{x^2 - x}{x + 1} dx$$

$$45. \int \frac{\sec x}{\sqrt{\ln(\sec x + \tan x)}} dx$$

$$46. \int x \sin x dx$$

$$47. \int \ln x^2 dx$$

$$48. \int x^3 e^{5x} dx$$

$$49. \int e^x \sin x dx$$

$$50. \int (x^2 + 1)e^x dx$$

$$51. \int \sqrt{x} \ln x \, dx$$

$$52. \int \frac{\cos x}{1 + \sin x} \, dx$$

$$53. \int \frac{\ln(\cos x)}{\cot x} \, dx$$

$$54. \int x^5 \sqrt{x^2 + 1} \, dx$$

$$55. \int \frac{1}{3x^2 + 1} \, dx$$

$$56. \int \frac{e^x}{4 + 9e^{2x}} \, dx$$

$$57. \int \cos(\ln x) \, dx$$

$$58. \int \frac{x^2 + 2x - 1}{2x^3 + 3x^2 - 2x} \, dx$$

$$59. \int \frac{2}{x^2 - 6x + 10} \, dx$$

$$60. \int \frac{4x^2 - 7}{2x + 3} \, dx$$

$$61. \int \frac{x}{x - 3} \, dx$$

$$62. \int \frac{x + 5}{x^2 + x - 2} \, dx$$

$$63. \int \cos^3 x \, dx$$

64. $\int \cot^4 \theta \, d\theta$

65. $\int x^2(x-2)^{3/2} \, dx$

66. $\int u \sec^2 u \, du$

67. $\int \frac{1}{x^2 - 5x + 6} \, dx$

68. $\int \frac{1}{\sqrt{-x^2 + 6x - 8}} \, dx$

69. $\int \frac{1}{x^2 - 2x + 5} \, dx$

70. $\int \ln(x^2 + 1) \, dx$

71. $\int x^2 \ln x \, dx$

72. $\int \frac{1}{y^3 - y} \, dy$

73. $\int \sqrt{1 - 9x^2} \, dx$

74. $\int \frac{1}{x\sqrt{x^2 + 4}} \, dx$

75. $\int \sin \sqrt{x} \, dx$

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

$$77. \int \frac{1 - \tan x}{1 + \tan x} dx$$

$$78. \int \frac{3}{x^5} \sqrt{\frac{x^4 + 1}{x^4}} dx$$

$$79. \int [\ln(3x^2 + 6x + 3) - 2 \ln(x + 1)] dx$$

$$80. \int \frac{e^{\tan^{-1}(2x)}}{5 + 20x^2} dx$$

$$81. \int \frac{3x - 2}{x^2 + 1} dx$$

$$82. \int \sqrt{(7 - x)(x - 1)} dx$$

$$83. \int (1 - 4x^2)e^{-2x^2} dx$$

$$84. \int \left(\frac{1}{\ln x} - \frac{1}{(\ln x)^2} \right) dx$$