72 道积分题

秋分ㄟ
仅仅是在知乎凑热闹的学生，勿扰

原文章为：湖心亭看雪：这 72 道积分题目会积了，绝对是高高手
系列：
秋分ㄟ：72 道积分题略详解析（01-20）
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秋分ㄟ：72 道积分题略详解析（51-72）
以下是全部 72 道题

正文

1. $\displaystyle\int \frac{1}{5x+3}\,\mathrm{d}x$
2. $\displaystyle\int \mathrm{e}^{2x+3}\,\mathrm{d}x$
3. $\displaystyle\int x\mathrm{e}^{x^2}\,\mathrm{d}x$
4. $\displaystyle\int x\sqrt{1-x^2}\,\mathrm{d}x$
5. $\displaystyle\int \frac{1}{x^2}\sin\frac{1}{x}\,\mathrm{d}x$
6. $\displaystyle\int \frac{\mathrm{e}^{3\cdot\sqrt{x}}}{\sqrt{x}}\,\mathrm{d}x$
7. $\displaystyle\int \frac{\mathrm{d}x}{x(x^6+1)}$
8. $\displaystyle\int \cos 2x\,\mathrm{d}x$
9. $\displaystyle\int \frac{\sin x}{\sqrt{5+\cos x}}\,\mathrm{d}x$
10. $\displaystyle\int \tan^4 x\,\mathrm{d}x$
11. $\displaystyle\int \frac{\mathrm{e}^{2x}}{1+\mathrm{e}^x}\,\mathrm{d}x$
12. $\displaystyle\int \frac{1}{1+\mathrm{e}^x}\,\mathrm{d}x$
13. $\displaystyle\int \frac{1}{x\ln^2 x}\,\mathrm{d}x$
14. $\displaystyle\int \frac{1}{x(1+2\ln x)}\,\mathrm{d}x$
15. $\displaystyle\int \frac{\mathrm{d}x}{a^2\cos^2 x+b^2\sin^2 x}$
16. $\displaystyle\int \frac{\mathrm{d}x}{x^2+a^2}$
17. $\displaystyle\int \frac{\mathrm{d}x}{a^2-x^2}$
18. $\displaystyle\int \frac{\mathrm{d}x}{\sqrt{a^2-x^2}}$
19. $\displaystyle\int \sin^3 x\,\mathrm{d}x$
20. $\displaystyle\int \sin^5 x\,\mathrm{d}x$

21. $\int \cos^3 x \, \mathrm{d}x$

22. $\int \sin^4 x \, \mathrm{d}x$

23. $\int \sin^2 x \cos^5 x \, \mathrm{d}x$

24. $\int \sec x \, \mathrm{d}x$

25. $\int \sec^3 x \tan^5 x \, \mathrm{d}x$

26. $\int \tan^5 x \sec^4 x \, \mathrm{d}x$

27. $\int \dfrac{\ln(\tan x)}{\sin x \cos x} \, \mathrm{d}x$

28. $\int \cos 3x \cos 2x \, \mathrm{d}x$

29. $\int \dfrac{\sin x}{1 + \sin x} \, \mathrm{d}x$

30. $\int \dfrac{\mathrm{d}x}{\sin 2x \cos x}$

31. $\int \dfrac{\arctan \sqrt{x}}{\sqrt{x}(x+1)} \, \mathrm{d}x$

32. $\int \dfrac{1 + \ln x}{2 + (x + \ln x)^2} \, \mathrm{d}x$

33. $\int \dfrac{2x - 3}{x^2 - 3x + 1} \, \mathrm{d}x$

34. $\int \dfrac{x + 1}{x^2 - 3x + 1} \, \mathrm{d}x$

35. $\int \dfrac{1 - \ln x}{(x - \ln x)^2} \, \mathrm{d}x$

36. $\int \sqrt{a^2 - x^2} \, \mathrm{d}x$

37. $\int \dfrac{\mathrm{d}x}{\sqrt{x^2 - a^2}}$

38. $\int \dfrac{\mathrm{d}x}{\sqrt{x^2 + a^2}}$

39. $\int \dfrac{\mathrm{d}x}{\sqrt{x} + \sqrt[3]{x}}$

40. $\int \dfrac{\mathrm{d}x}{(1 + x^2)^2}$

41. $\int \dfrac{3x + 1}{\sqrt{x^2 + 2x - 5}} \, \mathrm{d}x$

42. $\int \dfrac{\mathrm{d}x}{x^2 \sqrt{x^2 - 1}}$

43. $\int \dfrac{\mathrm{d}x}{x^6 (1 + x^2)}$

44. $\int \sqrt{1 + \sqrt{x}} \, \mathrm{d}x$

45. $\int x \cos x \, \mathrm{d}x$

46. $\int x^2 \cos x \, \mathrm{d}x$

47. $\int x \mathrm{e}^x \, \mathrm{d}x$

48. $\int x^2 \mathrm{e}^x \, \mathrm{d}x$

49. $\int x^2 \cos^2 \dfrac{x}{2} \, \mathrm{d}x$

50. $\int x \tan^2 x \, \mathrm{d}x$

51. $\int x \ln x \, \mathrm{d}x$

52. $\int \ln x \, \mathrm{d}x$

53. $\int \dfrac{1}{1 + \cos x} \, \mathrm{d}x$

54. $\int \dfrac{1}{1 + \sin x} \, \mathrm{d}x$

55. $\int \dfrac{x}{x^4 + 4} \, \mathrm{d}x$

56. $\int \dfrac{x^2 + 2}{(x + 1)^3} \, \mathrm{d}x$

57. $\displaystyle\int \frac{x^5}{\sqrt{1-x^2}}\,\mathrm{d}x$

58. $\displaystyle\int \frac{\sqrt{x+1}-1}{\sqrt{x+1}+1}\,\mathrm{d}x$

59. $\displaystyle\int x(1-2x)^{99}\,\mathrm{d}x$

60. $\displaystyle\int \frac{\mathrm{d}x}{x\ln x\ln(\ln x)}$

61. $\displaystyle\int \frac{x^7}{x^4+2}\,\mathrm{d}x$

62. $\displaystyle\int (\arcsin x)^2\,\mathrm{d}x$

63. $\displaystyle\int \sec^3 x\,\mathrm{d}x$

64. $\displaystyle\int \frac{\mathrm{d}x}{2+\sin x}$

65. $\displaystyle\int \frac{x^3}{x^8-2}\,\mathrm{d}x$

66. $\displaystyle\int \arctan x\,\mathrm{d}x$

67. $\displaystyle\int \frac{x^{2n-1}}{x^n+1}\,\mathrm{d}x$

68. $\displaystyle\int_{\frac{\pi}{4}}^{\frac{\pi}{3}} \frac{\tan x}{\ln(\cos x)}\,\mathrm{d}x$

69. $\displaystyle\int_{-1}^{1} \frac{\mathrm{d}x}{1+x^2}$

70. $\displaystyle\int_0^{\pi} \sqrt{\sin^3 x-\sin^5 x}\,\mathrm{d}x$

71. $I=\displaystyle\int_0^{\frac{\pi}{2}} \frac{\sin\theta}{\sin\theta+\cos\theta}\,\mathrm{d}\theta$

72. $\displaystyle\int_0^{\frac{\pi}{2}} \mathrm{e}^x\sin x\,\mathrm{d}x$