DEFINITE INTEGRATION MIX

Part 1

1. $\displaystyle\int_0^2 \frac{1}{\sqrt{4x+1}}\ dx = 1$

2. $\displaystyle\int_0^{\frac{\pi}{2}} \sin 2x\ dx = 1$

3. $\displaystyle\int_0^{\frac{\pi}{6}} \sin\left(4x+\frac{\pi}{6}\right)\ dx = \frac{\sqrt{3}}{4}$

4. $\displaystyle\int_0^{\frac{\pi}{2}} \sin^2 x\ dx = \frac{\pi}{4}$

5. $\displaystyle\int_1^2 x^3 \ln x\ dx = 4\ln 2 - \frac{15}{16}$

6. $\displaystyle\int_0^{\frac{1}{2}} \frac{x}{(2-x)^2}\ dx = \frac{1}{3} + \ln\frac{3}{4}$

7. $\displaystyle\int_1^2 \frac{x}{(2x-1)^2}\ dx = \frac{2+\ln 27}{12}$

8. $\displaystyle\int_0^1 \frac{3x}{(x+1)(x-2)}\ dx = -\ln 2$

9. $\displaystyle\int_0^{\frac{\pi}{4}} \tan^2 x\ dx = \frac{1}{4}(4-\pi)$

10. $\displaystyle\int_0^2 \frac{x+2}{\sqrt{4x+1}}\ dx = \frac{17}{6}$

11. $\displaystyle\int_0^1 x\mathrm{e}^{-2x}\ dx = \frac{1}{4}\left(1-3\mathrm{e}^{-2}\right)$

12. $\displaystyle\int_0^2 \frac{2x}{\sqrt{x^2+4}}\ dx = 4\left(\sqrt{2}-1\right)$

13. $\displaystyle\int_{\frac{1}{6}}^{\frac{1}{3}} \frac{14x+1}{(2x+1)(1-x)}\ dx = 3\ln\left(\frac{5}{4}\right)$

14. $\displaystyle\int_0^{36} \frac{1}{\sqrt{x}\left(\sqrt{x}+2\right)}\ dx = \ln 16$

15. $\displaystyle\int_0^{\frac{\pi}{4}} 12x\cos 2x\ \ dx = \frac{3}{2}(\pi-2)$

16. $\displaystyle\int_0^{\frac{\pi}{2}} (2\sin x-3\cos x)^2\ \ dx = \frac{1}{4}(13\pi-24)$

17. $\displaystyle\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} 4x\sin 2x\ \ dx = \pi-1$

18. $\displaystyle\int_{-6}^{\frac{3}{2}} \frac{x}{\sqrt{4-2x}}\ dx = -\frac{9}{2}$

19. $\displaystyle\int_1^5 \frac{x+1}{(2x-1)^{\frac{3}{2}}}\ dx = 2$

20. $\displaystyle\int_0^{\frac{1}{12}\pi} 6\sin^2\theta\ \ d\theta = \frac{1}{4}(\pi-3)$

21. $\displaystyle\int_0^{\frac{1}{2}} \frac{1}{(1-x)(1+x)^2}\ dx = \frac{1}{6}+\frac{1}{4}\ln 3$

22. $\displaystyle\int_0^{\frac{1}{4}\pi} x\sec^2 x\ \ dx = \frac{1}{4}(\pi-\ln 4)$

23. $\displaystyle\int_0^1 \frac{9}{(2x+1)^4}\,dx = \frac{13}{9}$

24. $\displaystyle\int_0^{\frac{1}{2}\pi} 8x\sin^2 x\,dx = \frac{1}{2}\left(\pi^2+4\right)$

25. $\displaystyle\int_0^{\frac{1}{4}\pi} 2x\cos 4x\,dx = -\frac{1}{4}$

26. $\displaystyle\int_0^{\frac{1}{4}\pi} (\cos x+\sec x)^2\,dx = \frac{5}{8}(\pi+2)$

27. $\displaystyle\int_{\ln 2}^{\ln 5} \frac{3\mathrm{e}^{2x}}{\sqrt{\mathrm{e}^x-1}}\,dx = 20$

28. $\displaystyle\int_0^3 \frac{x^2}{\sqrt{x+1}}\,dx = \frac{76}{15}$

29. $\displaystyle\int_2^6 \frac{5x+3}{(2x-3)(x+2)}\,dx = \ln 54$

30. $\displaystyle\int_0^{\ln 2} 4x\mathrm{e}^{-x}\,dx = 2-\ln 4$

31. $\displaystyle\int_0^3 \frac{x}{x^2+9}\,dx = \frac{1}{2}\ln 2$

32. $\displaystyle\int_0^{\frac{1}{4}\pi} \sin\left(2x+\frac{\pi}{4}\right)\,dx = \frac{\sqrt{2}}{2}$

33. $\displaystyle\int_{\frac{2}{3}}^1 \frac{x}{2x-1}\,dx = \frac{1}{6}+\frac{1}{4}\ln 3$

34. $\displaystyle\int_0^4 \frac{13-2x}{(x+4)(2x+1)}\ dx = 4\ln 3 - 3\ln 2$

35. $\displaystyle\int_1^{\mathrm{e}} \ln x\ dx = 1$

36. $\displaystyle\int_{\frac{1}{6}\pi}^{\frac{1}{3}\pi} \cos 3x\ dx = -\frac{1}{3}$

37. $\displaystyle\int_0^{\frac{1}{2}\pi} 4\cos x\,(1+\sin x)^3\ dx = 15$

38. $\displaystyle\int_{\frac{1}{8}}^{\frac{1}{6}\pi} \cot^2 2x\ dx = \frac{1}{2} - \frac{1}{6}\sqrt{3} - \frac{1}{24}\pi$

39. $\displaystyle\int_0^{\frac{1}{2}} \frac{3-5x}{(1-x)(2-3x)}\ dx = \frac{4}{3}\ln 2$

40. $\displaystyle\int_{\ln 2}^{\ln 4} \left(\mathrm{e}^{2x}-2\right)^2\ dx = 4(9+\ln 2)$

41. $\displaystyle\int_0^{\frac{1}{2}\pi} x\sin 2x\ dx = \frac{1}{4}\pi$

42. $\displaystyle\int_{-1}^{1} \frac{9+4x^2}{9-4x^2}\ dx = -2+3\ln 5$

43. $\displaystyle\int_{-1}^{7} \frac{x^2}{\sqrt{x+2}}\ dx = \frac{652}{15}$

44. $\displaystyle\int_0^2 \frac{6}{3x+2}\ dx = \ln 16$

45. $\displaystyle\int_2^5 \frac{1}{4+\sqrt{x-1}}\,dx = 2+8\ln\left(\frac{5}{6}\right)$

46. $\displaystyle\int_0^{\frac{1}{4}\pi} \frac{\cos 2x}{\cos^2 x}\,dx = \frac{1}{2}(\pi-2)$

47. $\displaystyle\int_0^{\frac{\pi}{4}} \cos\left(3x+\frac{\pi}{4}\right)\,dx = -\frac{\sqrt{2}}{6}$

48. $\displaystyle\int_2^4 \frac{8}{(3x-4)^3}\,dx = \frac{5}{16}$

49. $\displaystyle\int_1^{\frac{5}{2}} \frac{4x}{\sqrt{2x-1}}\,dx = \frac{20}{3}$

50. $\displaystyle\int_0^{\frac{\pi}{3}} \cos\left(3x+\frac{\pi}{3}\right)\,dx = -\frac{\sqrt{3}}{3}$

51. $\displaystyle\int_0^1 \frac{18-4x-x^2}{(4-3x)(1+x)^2}\,dx = \frac{7}{3}\ln 2+\frac{3}{2}$

52. $\displaystyle\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} (\sin x+\cot x)^2\,dx = \frac{1}{8}\left(26-\pi-4\sqrt{2}\right)$

53. $\displaystyle\int_0^{\frac{\pi}{3}} \tan^3 x\,dx = \frac{3}{2}-\ln 2$

54. $\displaystyle\int_{\frac{1}{\mathrm{e}}}^1 x\ln x\,dx = \frac{1}{4}\left(\frac{3}{\mathrm{e}^2}-1\right)$

55. $\displaystyle\int_0^1 \frac{x}{(1+x)^2}\,dx = \ln 2-\frac{1}{2}$

56. $\displaystyle\int_2^3 \frac{x^2-4x+9}{(4-x)(1-x)^2}\,dx = 1+\ln 2$

57. $\displaystyle\int_0^{\frac{\pi}{12}} 10\sin 8\theta\cos 2\theta\,d\theta = \frac{1}{12}\left(16+3\sqrt{3}\right)$

58. $\displaystyle\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \sin\left(4x+\frac{\pi}{6}\right)\,dx = -\frac{\sqrt{3}}{8}$

59. $\displaystyle\int_1^{\mathrm{e}} \left(x^2+1\right)\ln x\,\,dx = \frac{2}{9}\left(\mathrm{e}^3+5\right)$

60. $\displaystyle\int_{\frac{\pi}{3}}^{\frac{5\pi}{3}} (1-2\cos x)^2\,\,dx = 4\pi+3\sqrt{3}$

61. $\displaystyle\int_0^3 x\sqrt{x+1}\,\,dx = \frac{116}{15}$

62. $\displaystyle\int_2^3 \frac{x^2+x+2}{x^2+2x-3}\,dx = 1+\ln\left(\frac{25}{18}\right)$

63. $\displaystyle\int_0^1 \frac{9}{(2x+1)^2}\,dx = 3$

64. $\displaystyle\int_0^{\frac{\pi}{6}} \sin x\sin 3x\,\,dx = \frac{\sqrt{3}}{16}$

65. $\displaystyle\int_0^{\sqrt{2}} x^3\ln\left(x^2+2\right)\,\,dx = \frac{1}{2}+\ln 2$

66. $\displaystyle\int_0^{\frac{1}{4}} \frac{4}{(1+2x)(1-2x)}\,\,dx = \ln 3$

67. $\displaystyle\int_0^{\frac{\pi}{2}} \cos^3 x \ dx = \frac{2}{3}$

68. $\displaystyle\int_0^3 \frac{4}{2x+3} \ dx = \ln 9$

69. $\displaystyle\int_0^2 \frac{6x^3}{\sqrt{x^2+1}} \ dx = 4\left(1+\sqrt{5}\right)$

70. $\displaystyle\int_5^8 \frac{2x^2}{x^2-16} \ dx = 6+4\ln 3$

71. $\displaystyle\int_1^2 \frac{\ln x}{x} \ dx = \frac{1}{2}(\ln 2)^2$

72. $\displaystyle\int_0^1 \frac{17-5x}{(3+2x)(2-x)^2} \ dx = \frac{1}{2}+\ln\left(\frac{10}{3}\right)$

73. $\displaystyle\int_0^{\pi} x\cos\left(\frac{1}{4}x\right) \ dx = 2\sqrt{2}\left(\pi+4\right)-16$

74. $\displaystyle\int_0^4 \mathrm{e}^{\frac{1}{2}x} \ dx = 2\left(\mathrm{e}^2-1\right)$

75. $\displaystyle\int_4^9 \frac{5x^2-8x+1}{2x(x-1)^2} dx = \ln\left(\frac{32}{3}\right)-\frac{5}{24}$

76. $\displaystyle\int_0^1 \frac{3}{\left(\sqrt{x}-2\right)\left(\sqrt{x}+1\right)} \ dx = -\ln 4$

77. $\displaystyle\int_0^{\frac{\pi}{3}} \frac{1}{1-\sin x} \ dx = 1+\sqrt{3}$

78. $\displaystyle\int_2^6 \frac{2x^2-x+11}{(x+2)(2x-3)}\,dx = 4+4\ln 3-3\ln 2$

79. $\displaystyle\int_{-1}^0 \frac{x^2}{1-x}\,dx = -\frac{1}{2}+\ln 2$

80. $\displaystyle\int_0^{100} \frac{1}{20-\sqrt{x}}\,dx = 40\ln 2-20$

81. $\displaystyle\int_0^1 \frac{x^2}{x^2-4}\,dx = 1-\ln 3$

82. $\displaystyle\int_0^{\frac{\pi}{6}} \sin^3\theta\,d\theta = \frac{2}{3}-\frac{3}{8}\sqrt{3} = \frac{1}{24}\left(16-9\sqrt{3}\right)$

83. $\displaystyle\int_0^{\ln 2} \frac{1}{1+\mathrm{e}^x}\,dx = \ln\left(\frac{4}{3}\right)$

84. $\displaystyle\int_0^4 \mathrm{e}^{\sqrt{2x+1}}\,dx = 2\mathrm{e}^3$

85. $\displaystyle\int_0^1 \frac{x^3}{x+1}\,dx = \frac{5}{6}-\ln 2$

86. $\displaystyle\int_0^1 \frac{10}{(x+1)(x+3)(2x+1)}\,dx = 3\ln 3-3\ln 2$

87. $\displaystyle\int_0^{\frac{\pi}{2}} \left[1+\tan\left(\frac{1}{2}x\right)\right]^2\,dx = 2+\ln 4$

88. $\displaystyle\int_0^{\frac{\pi}{3}} \frac{\sin 2x}{1+\cos x}\,dx = 1+2\ln\left(\frac{3}{4}\right)$

89. $\displaystyle\int_0^1 3x^2 \ln(x+1)\ dx = -\frac{5}{6} + \ln 4$

90. $\displaystyle\int_0^{\frac{1}{4}} 2x\sqrt{1-4x}\ dx = \frac{1}{30}$

91. $\displaystyle\int_1^{\mathrm{e}} x(1-\ln x)\ dx = \frac{1}{4}\left(\mathrm{e}^2 - 3\right)$

92. $\displaystyle\int_{-\frac{1}{3}}^0 \frac{1}{3-6x-9x^2}\ dx = \frac{1}{12}\ln 3$

93. $\displaystyle\int_0^{\frac{\pi}{2}} x\sin^2 x\ dx = \frac{1}{16}\left(\pi^2 + 4\right)$

94. $\displaystyle\int_1^{\mathrm{e}} x(\ln x)^2\ dx = \frac{1}{4}\left(\mathrm{e}^2 - 1\right)$

95. $\displaystyle\int_0^{\frac{\pi}{2}} \sin x\cos x(1+\sin x)^5\ dx = \frac{107}{14}$

96. $\displaystyle\int_2^5 \frac{x^2}{\sqrt{x-1}}\ dx = \frac{356}{15}$

97. $\displaystyle\int_0^5 \frac{1}{(x+1)(x+2)(x+3)}\ dx = \ln\left(\frac{8}{7}\right)$

98. $\displaystyle\int_0^{\pi} (x-1)(x+3)\sin x\ dx = \pi^2 + 2\pi - 10$

99. $\displaystyle\int_{-1}^0 3\ln(2x+3)\ dx = \frac{3}{2}(\ln 27 - 2)$

100. $\displaystyle\int_0^{\frac{\pi}{6}} 12\sec^3 x \ dx = 4+3\ln 3$

101. $\displaystyle\int_{\sqrt{5}}^{2\sqrt{3}} \frac{\sqrt{x^2+4}}{x} \ dx = 1+\ln\left(\frac{5}{3}\right)$

102. $\displaystyle\int_{\mathrm{e}^{-1}}^{\mathrm{e}} x\left[(\ln x)^2-1\right] \ dx = -\frac{1}{4}\left(\mathrm{e}^2+3\mathrm{e}^{-2}\right)$

103. $\displaystyle\int_0^1 \frac{x^2}{x^2+1} \ dx = 1-\frac{\pi}{4}$

104. $\displaystyle\int_0^{\frac{\pi}{2}} \mathrm{e}^{\cos x}\sin x\cos x \ dx = 1$

Part 2

1. $\displaystyle\int_0^{\sqrt{2}} \frac{x^2}{\sqrt{4-x^2}}\,dx = \frac{\pi}{2}-1$, use $x = 2\sin\theta$

2. $\displaystyle\int_1^{\sqrt{2}} \frac{1}{x^2\sqrt{4-x^2}}\,dx = \frac{1}{4}\left(\sqrt{3}-1\right)$, use $x = 2\cos\theta$

3. $\displaystyle\int_0^{1} \frac{1}{\left(1+x^2\right)^2}\,dx = \frac{1}{8}\left(\pi+2\right)$, use $x = \tan\theta$

4. $\displaystyle\int_{\sqrt{2}}^{2} \frac{1}{x^2\sqrt{x^2-1}}\,dx = \frac{1}{2}\left(\sqrt{3}-\sqrt{2}\right)$, use $x = \sec\theta$

5. $\displaystyle\int_0^{\frac{3}{4}} \frac{1}{\sqrt{3-4x^2}}\,dx = \frac{\pi}{6}$, use $x = \frac{\sqrt{3}}{2}\sin\theta$

6. $\displaystyle\int_0^{1} \frac{1}{\left(1+3x^2\right)^{\frac{3}{2}}}\,dx = \frac{1}{2}$, use $x = \frac{1}{\sqrt{3}}\tan\theta$

7. $\displaystyle\int_0^{1} \frac{1}{\sqrt{2-x^2}}\,dx = \frac{\pi}{4}$, use $x = \sqrt{2}\sin\theta$

8. $\displaystyle\int_0^{\frac{1}{2}} \frac{1}{4x^2+3}\,dx = \frac{\pi\sqrt{3}}{36}$, use $x = \frac{\sqrt{3}}{2}\tan\theta$

9. $\displaystyle\int_0^{1} \frac{1}{\left(4-x^2\right)^{\frac{3}{2}}}\,dx = \frac{\sqrt{3}}{12}$, use $x = 2\sin\theta$

10. $\displaystyle\int_{\sqrt{2}}^{2} \frac{\sqrt{x^2-1}}{x}\,dx = \sqrt{3}-1-\frac{\pi}{12}$, use $x = \operatorname{cosec}\theta$

11. $\displaystyle\int_0^1 \frac{1}{\sqrt{4-3x^2}}\,dx = \frac{\pi\sqrt{3}}{9}$, use $x = \frac{2}{\sqrt{3}}\sin\theta$

12. $\displaystyle\int_1^{\sqrt{3}} \frac{x^2}{x^2+1}\,dx = \sqrt{3} - 1 - \frac{\pi}{12}$, use $x = \tan\theta$

13. $\displaystyle\int_0^2 \sqrt{16-x^2}\,dx = \frac{1}{3}\left(4\pi + 6\sqrt{3}\right)$, use $x = 4\sin\theta$

14. $\displaystyle\int_0^2 \frac{1}{\left(3x^2+4\right)^{\frac{3}{2}}}\,dx = \frac{1}{8}$, use $x = \frac{2}{\sqrt{3}}\tan\theta$

15. $\displaystyle\int_0^2 \sqrt{16-3x^2}\,dx = \frac{8\pi\sqrt{3}}{9} + 2$, use $x = \frac{4}{\sqrt{3}}\sin\theta$

16. $\displaystyle\int_0^3 \frac{27}{\left(9+x^2\right)^2}\,dx = \frac{\pi}{8} + \frac{1}{4}$, use $x = 3\tan\theta$

Part 3

1. $\displaystyle\int_4^8 \sqrt{x^2-16}\ dx = 16\sqrt{3}-8\ln\left(2+\sqrt{3}\right)$

2. $\displaystyle\int_0^1 \frac{1}{\sqrt{x}\left(x+1\right)}\ dx = \frac{\pi}{2}$

3. $\displaystyle\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \sec x\ dx = \ln\left|\frac{2}{3}\sqrt{3}+1\right|$

4. $\displaystyle\int_0^1 x^3\sqrt{x^2+1}\ dx = \frac{2}{15}\left(\sqrt{2}+1\right)$

5. $\displaystyle\int_{\ln 2}^{\ln 3} \frac{\cosh x+1}{\sinh x\left(\cosh x-1\right)}\ dx = \frac{5}{2}$

6. $\displaystyle\int_1^{\sqrt{3}} x\arctan x\ dx = \frac{5\pi}{12}+\frac{1}{2}\left(1-\sqrt{3}\right)$

7. $\displaystyle\int_{\frac{4}{3}}^{\frac{5}{3}} \frac{x+1}{\sqrt{9x^2-16}}\ dx = \frac{1}{3}\left(1+\ln 2\right)$

8. $\displaystyle\int_{\frac{3}{2}}^{\frac{5}{2}} \sqrt{4x^2-9}\ dx = 5-\frac{9}{4}\ln 3$

9. $\displaystyle\int_0^4 \operatorname{arsinh}\sqrt{x}\ dx = \frac{9}{2}\ln\left(2+\sqrt{5}\right)-\sqrt{5}$

10. $\displaystyle\int_0^1 \frac{x^2}{\sqrt{x^2+1}}\ dx = \frac{1}{2}\left(\sqrt{2}-\ln\left(1+\sqrt{2}\right)\right)$

11. $\displaystyle\int_5^7 \frac{1}{x^2-10x+29}\ dx = \frac{\pi}{8}$

12. $\displaystyle\int_5^7 \frac{1}{\sqrt{x^2-10x+29}}\ dx = \ln\left(1+\sqrt{2}\right)$

13. $\displaystyle\int_{2.5}^{7.5} \frac{180}{4x^2+75}\ dx = \sqrt{3}\pi$

14. $\displaystyle\int_{2}^{3} \frac{1}{\sqrt{3+2x-x^2}}\ dx = \frac{\pi}{3}$

15. $\displaystyle\int_{5}^{7} \frac{x+1}{x^2+9}\ dx = \frac{1}{2}\ln 2 + \frac{\pi}{12}$

16. $\displaystyle\int_{0}^{\frac{\pi}{3}} \frac{1}{9\cos^2 x+\sin^2 x}\ dx = \frac{\pi}{18}$

17. $\displaystyle\int_{0}^{\frac{1}{2}\ln 3} \operatorname{sech} x\ dx = \frac{\pi}{6}$

18. $\displaystyle\int_{0}^{\frac{1}{\sqrt{3}}} \frac{4}{1-x^4}\ dx = \ln\left(\frac{\sqrt{3}+1}{\sqrt{3}-1}\right)+\frac{\pi}{3}$

19. $\displaystyle\int_{0}^{\frac{3}{2}} \frac{8}{4x^2+9}\ dx = \frac{\pi}{3}$

20. $\displaystyle\int_{0}^{1} \frac{10}{(x+1)\left(x^2+4\right)}\ dx = \ln\left(\frac{16}{5}\right)+\arctan\left(\frac{1}{2}\right)$

21. $\displaystyle\int_{0}^{3} \frac{8x}{(x+2)\left(x^2+4\right)}\ dx = \ln\left(\frac{26}{25}\right)+2\left(\arctan\left(\frac{1}{2}\right)-\arctan 1\right)$

22. $\displaystyle\int_{0}^{\frac{9}{4}} \frac{1}{\sqrt{x(9-x)}}\ dx = \frac{\pi}{3}$

23. $\displaystyle\int_{-1}^{0} \frac{(x+1)(x+2)}{(x-1)\left(x^2+1\right)}\ dx = \frac{\pi}{4}-2\ln 2$

24. $\displaystyle\int_{0}^{\frac{\pi}{2}} \frac{1}{1+3\cos 3x}\ dx = \frac{\sqrt{2}}{6}\ln\left(\sqrt{2}-1\right)$

25. $\displaystyle\int_{-1}^{1}\frac{1}{\sqrt{x^2+2x+5}}\,dx=\ln\left(1+\sqrt{2}\right)$

26. $\displaystyle\int_{0}^{\sqrt{3}}\frac{x}{x^4+9}\,dx=\frac{\pi}{24}$

27. $\displaystyle\int_{-\frac{5}{3}}^{\frac{5}{6}}\frac{1}{\sqrt{25-9x^2}}\,dx=\frac{2\pi}{9}$

28. $\displaystyle\int_{1}^{2}\sqrt{x^2-2x+2}\,dx=\frac{1}{2}\ln\left(1+\sqrt{2}\right)-\frac{1}{2}\sqrt{2}$

29. $\displaystyle\int_{1}^{2}\frac{\sqrt{x}}{\sqrt{9-x^3}}\,dx=\frac{2}{3}\arccos\frac{1}{3}$

30. $\displaystyle\int_{0}^{\frac{\pi}{4}}\frac{\sec^2 x}{\sqrt{3-\sec^2 x}}\,dx=\frac{\pi}{4}$

31. $\displaystyle\int_{0}^{2}\frac{1}{\left(x^2+4\right)^{\frac{3}{2}}}\,dx=\frac{1}{8}\sqrt{2}$

32. $\displaystyle\int_{1}^{2}\frac{x^2}{\sqrt{x^2+1}}\,dx=\frac{1}{2}\left[\sqrt{2}-\ln\left(\sqrt{2}+1\right)\right]$

33. $\displaystyle\int_{0}^{2}\frac{36-3x}{4+3x^2}\,dx=2\pi\sqrt{3}-\ln 2$

34. $\displaystyle\int_{0}^{\frac{1}{2}}\sqrt{\frac{x}{1-x}}\,dx=\frac{1}{4}\left[\pi-2\right]$

35. $\displaystyle\int_{1}^{4}\frac{1}{(x+9)\sqrt{x}}\,dx=\frac{2}{3}\arctan\left(\frac{3}{11}\right)$

36. $\displaystyle\int_{0}^{\frac{\pi}{2}}\frac{1}{1+\sin x}\,dx=\frac{\sqrt{3}}{9}\pi$

37. $\displaystyle\int_{\frac{1}{2}\ln 3}^{\ln 3} \frac{1}{5\cosh x - 4\sinh x}\ dx = \frac{\pi}{18}$

38. $\displaystyle\int_{0}^{\sqrt{12}} \operatorname{arsinh}\left(\frac{1}{2}x\right)\ dx = 2\sqrt{3}\ln\left(2+\sqrt{3}\right) - 2$