Answers to lots of lovely Integrals

1. $x\sin x + \cos x + C$
2. $1 - 3e^{-2}$
3. $\frac{26}{3}$
4. $\frac{1}{3}(1-x^2)^{3/2} - (1-x^2)^{1/2} + C$
5. $\frac{1}{2}\tan 2\theta + C$
6. $-\frac{1}{4}(2x-3)^{-2} + C$
7. $2x^{1/2} - \frac{2}{3}x^{3/2} + C$
8. $\frac{1}{3}\ln|x^3 - 3x + 1| + C$
9. $\frac{2}{3}(\ln x)^{3/2} + C$
10. $2\ln\left(\frac{3}{2}\right) - \frac{1}{2}$
11. $\frac{68}{15}$
12. $\frac{1}{4}\ln|2x-3| - \frac{3}{4(2x-3)} + C$
13. $-2\cos\sqrt{x} + C$
14. $\frac{(\ln x)^2}{2} + C$
15. $\frac{2}{5}(x+1)^{5/2} - \frac{2}{3}(x+1)^{3/2} + C$
16. π
17. $\frac{e-2}{8}$
18. $\frac{11+3e^2}{6}$
19. $x^2\sin x + 2x\cos x - 2\sin x + C$
20. $\frac{1}{7}e^{7x} + C$
21. $\frac{1}{11}\sin 11x + C$
22. $\frac{1}{10}e^{5x^2} + C$
23. $\cos(\cos x) + C$
24. $2\left(1 + \ln\left(\frac{2}{3}\right)\right)$
25. $\frac{184}{105}$
26. $2\ln(\sqrt{x}+1) + C$
27. $\frac{2}{5}(1+x)^{5/2} - \frac{4}{3}(1+x)^{3/2} + 2(1+x)^{1/2} + C$
28. $\frac{1}{4}(1+2x) - \frac{1}{4}\ln|1+2x| + C$ or $\frac{1}{2}x - \frac{1}{4}\ln|1+2x| + C$
29. $\frac{1}{2}(1+x)^2 - 2(1+x) + \ln|1+x| + C$ or $\frac{x^2}{2} - x + \ln|1+x| + C$
30. $\frac{1}{4}\ln|4x+7| + C$
31. $\frac{1}{2}\ln(x^2 - 4x + 11) + C$
32. $x + \ln(x^2 - 3x + 3) + C$
33. $\frac{14}{3}$
34. $\frac{2}{7}(x+2)^7 - \frac{2}{3}(x+2)^6 + C$
    or $\frac{x}{3}(x+2)^6 - \frac{1}{21}(x+2)^7 + C$
35. $\frac{2}{9}(3x-2)^{3/2} + C$
36. $-3\cos(x^2-4) + C$
37. $-\frac{5}{2}\sin(5-x^2) + C$
38. $\frac{1}{11}(x+2)^{11} - \frac{1}{5}(x+2)^{10} + C$
    or $\frac{1}{10}x(x+2)^{10} - \frac{1}{110}(x+2)^{11} + C$
39. $\frac{1}{10}(x+2)^{10} + C$
40. $\frac{1}{30}(3x+2)^{10} + C$
41. $\frac{1}{2}(2x+3)^{3/2} - \frac{9}{2}(2x+3)^{1/2} + C$
42. $\frac{9}{14}$
43. $\frac{2}{5}$
44. $\frac{1}{4}x^4\ln x - \frac{1}{16}x^4 + C$
45. $x\ln x - x + C$
46. $-\frac{2}{3}x\cos(3x-1) + \frac{2}{9}\sin(3x-1) + C$
47. $x^2\ln(x+1) - \frac{x^2}{2} + x - \ln|x+1| + C$
48. $\frac{1}{2}x^2\ln(2x+1) - \frac{1}{4}x^2 + \frac{1}{4}x - \frac{1}{8}\ln|2x+1| + C$
49. $-\frac{\ln x}{2x^2} - \frac{1}{4x^2} + C$
50. $\frac{1}{3}x^2e^{3x} - \frac{2}{9}xe^{3x} + \frac{2}{27}e^{3x} + C$
51. $\frac{1}{2}e^x(\sin x - \cos x) + C$

52. $\frac{1}{5}e^x(\cos 2x + 2\sin 2x) + C$

53. $x\ln(2x+1) - x + \frac{1}{2}\ln|2x+1| + C$

54. $\frac{3}{4} - \frac{1}{2}\ln 2$

55. $-\ln|\cos x| + C$

56. $-\frac{1}{x} + C$

57. $2\ln|x| + C$

58. $-(x^2-4)^{-4} + C$

59. $4x^3 - 10x^2 + C$

60. $3\sin 3x + C$

61. $\frac{1}{3}\ln|x^3+1| + C$

62. $-\frac{1}{6}(\sin(2x+3))^{-3} + C$

63. $\frac{1}{2}\sin(x^2+3) + C$

64. $\tan(x^2+3) + C$

65. $\frac{2}{3}$

66. 1

67. $6 - \sqrt{2}$

68. $\frac{x^3}{3} - 4x - 4x^{-1} + C$

69. $\frac{3}{2}(3\sqrt{3} - \pi)$

70. $\frac{2}{3}$

71. $\frac{2}{3}(\ln x)^{3/2} + C$

72. $\frac{8}{25}e^5 + \frac{2}{25}$ or $\frac{2}{25}(4e^5 + 1)$

73. $-\frac{1}{2}\ln|\cos 2x| + C$

74. $\frac{1}{14}(e^{2x}+1)^7 + C$

75. $2\ln\left(\frac{2}{3}\right) + \frac{5}{6}$

76. $-e^{\cos x} + C$

77. $\frac{x^3}{3} - \frac{x^2}{2} + x - \ln|1+x| + C$
or $\frac{(1+x)^3}{3} - \frac{3(1+x)^2}{2} + 3(1+x) - \ln|1+x| + C$

78. $\frac{61}{192}$

79. $\frac{1}{3}$

80. $-\frac{2}{9}$

81. $-\frac{5}{18}$

82. $\frac{(\ln(x+1))^2}{2} + C$

83. $\frac{1}{7}e^{x^7-1} + C$

84. $-\frac{3}{11}(3-x)^{11} + \frac{1}{12}(3-x)^{12} + C$
or $-\frac{1}{11}x(3-x)^{11} - \frac{1}{132}(3-x)^{12} + C$

85. π ; $x\sin x$ is an even function
so $\int_{-\pi}^{0} x\sin x\,dx = \int_{0}^{\pi} x\sin x\,dx$

86. $\frac{2}{3}(\ln x)^3 + \frac{3}{2}(\ln x)^2 - \ln x + C$

87. $\sin(\ln x) + C$

88. $-\frac{1}{2}e^{5-2x} + C$

89. $\frac{x^3}{3} + 2x - x^{-1} + C$

90. $\frac{1}{2}x^2\sin(x^2) + \frac{1}{2}\cos(x^2) + C$

91. $\frac{32}{3}\ln 2 - \frac{7}{4}$

92. $\frac{2}{21}(3x^2+3x-1)^{7/2} + C$

93. $\frac{x^3}{3} + x^2 + 4x + 8\ln|x-2| + C$
or $\frac{(x-2)^3}{3} + 3(x-2)^2 + 12(x-2) + 8\ln|x-2| + C$

94. $\frac{1}{8}e^{4x^2-1} + C$

95. $\frac{1}{3}\ln 2$

96. $\frac{1}{2}\ln(x^2+6x-5) + C$

97. $\frac{1}{18}(2x+1)^9 - \frac{1}{8}(2x+1)^8 + C$
or $\frac{1}{16}(2x-1)(2x+1)^8 - \frac{1}{144}(2x+1)^9 + C$

98. $-\frac{1}{6}\cos^3 2x + C$

99. $2e^{\sqrt{x}} + C$

100. $x\ln 2 + \frac{x^2}{2} + C$
or $x\ln(2e^x) - \frac{x^2}{2} + C$