Math 1b. Integration Problems to Work on in Preparation for the Technique Test

February 9, 2006

1. $\int x \sec^2 x \, dx$

2. $\int \frac{4x+4}{2x+1} dx$

3. $\int 7x e^{x^2} dx$

4. $\int \frac{dx}{x^2+6x+9}$

5. $\int_{-10}^{10} \sin(x^3) \, dx$

6. $\int_{1}^{9} \sqrt{4+3x} \, dx$

7. $\int x \arctan x \, dx$

8. $\int e^x \sin x \, dx$

9. $\int x \ln x \, dx$

10. $\int \sin^2(7x) \, dx$

11. $\int \frac{4x^3+3x^2+2x+1}{x^4+x^3+x^2+x+1} dx$

12. $\int \frac{6x+3}{(x-1)(x-2)(x-3)} dx$

13. $\int x \cos(x^2) \, dx$

14. $\int x^2 \cos x \, dx$

15. $\int \frac{2x+1}{x^2+4x-5} dx$

16. $\int \cos^2 x \, dx$

17. $\int x^3 \cos x^2 \, dx$

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

19. $\int_{1}^{e} \ln x \, dx$

20. $\int (\ln x)^2 \, dx$

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

22. $\int_{e}^{e^3} \frac{1}{x \ln x} dx$

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

24. $\int \dfrac{x^2 - 1}{x^2 + 1}\, dx$

25. $\int \dfrac{x^2 + 1}{x^2 - 1}\, dx$

26. $\int \dfrac{x}{x^4 + 1}\, dx$

27. $\int \dfrac{x}{\sqrt{x^2 + 1}}\, dx$

28. $\int \dfrac{e^x}{e^{2x} - 4}\, dx$

29. $\int \dfrac{e^{2x}}{e^{2x} - 4}\, dx$

30. $\int_0^{\ln 3} \dfrac{e^x}{\sqrt{e^x + 4}}\, dx$

31. $\int \dfrac{x + 5}{x^2 - 2x - 3}\, dx$

32. $\int \dfrac{x^2 + 3}{x^2 + 1}\, dx$

33. $\int x^2 e^{x^3}\, dx$

34. $\int 3 \tan(2x)\, dx$

35. $\int e^{\tan x} \sec^2 x\, dx$

36. $\int \cos x \sin(2 \sin x)\, dx$

37. $\int -\dfrac{\ln(1 + x)}{(1 + x)^2}\, dx$

38. $\int \dfrac{2}{x^2 + 2x + 1}\, dx$

39. $\int \dfrac{1}{x(x + 2)}\, dx$

40. $\int \dfrac{x^2}{(x - 1)^2(x + 1)}\, dx$

41. $\int 3x \cos x\, dx$

42. $\int (x\sqrt{x^2 + 2x} + \sqrt{x^2 + 2x}\,)dx$

43. $\int_1^e \dfrac{\sin(\ln(x))}{x}\, dx$

44. $\int \sin(\ln(x))\, dx$

45. $\int \dfrac{3}{x^2(x^2 + 9)}\, dx$

46. $\int \dfrac{x^3}{x^2 + 1}\, dx$

47. $\int \dfrac{dx}{x^3 + x}$

48. $\int \dfrac{\sin(x)\, dx}{\cos^2(x) - 5\cos(x) + 4}$

49. $\int \dfrac{e^{\sqrt{x}}}{\sqrt{x}}\, dx$

50. $\int \dfrac{2x}{e^x}\, dx$

51. $\int \dfrac{x + 1}{x^2 + 1}\, dx$

52. $\int 2x e^{(x+1)^2} + 2e^{(x+1)^2}\, dx$

53. $\int \dfrac{2 - 3x}{(x^2(x - 1))}\, dx$

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54. $\displaystyle\int \frac{x}{\sqrt{1-x^2}}dx$

55. $\displaystyle\int x\sin((x+1)(x-1))\,dx$

56. $\displaystyle\int \frac{x^5-1}{x-1}dx$

57. $\displaystyle\int 2x((x^2+1)^2+1)^2 dx$

58. $\displaystyle\int_{-1/2}^{1/2} \frac{x^3}{\sqrt{1-x^2}}dx$

59. $\displaystyle\int_1^e x^2\ln x\,dx$

60. $\displaystyle\int \sin x\,\cos x\,dx$

61. $\displaystyle\int \frac{dx}{x\ln x\,\ln(\ln x)}$

62. $\displaystyle\int \sin^3(2x)\,dx$

63. $\displaystyle\int \ln\sqrt{x}\,dx$

64. $\displaystyle\int \frac{x+1}{x^2-4}\,dx$

65. $\displaystyle\int e^{e^x+x}\,dx$

66. $\displaystyle\int \frac{\cos(x)}{1+\sin(x)}\,dx$

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

68. $\displaystyle\int \frac{1}{x(x^2+a^2)}\,dx$

69. $\displaystyle\int \frac{x}{(x^2-a^2)^{3/2}}\,dx$

70. $\displaystyle\int x(\ln x)^2 dx$

71. $\displaystyle\int_0^1 \frac{1}{1+x^{\frac{1}{3}}}dx$

72. $\displaystyle\int \tan^2 x\,dx$

73. $\displaystyle\int_0^{\frac{1}{2}\ln 3} \frac{1}{e^x+e^{-x}}dx$

74. $\displaystyle\int_0^1 x^5\ln x\,dx$

75. $\displaystyle\int_1^2 \frac{e^{-\frac{1}{x}}}{x^2}dx$

76. $\displaystyle\int \frac{x}{\sqrt{x^2+3}}dx$

77. $\displaystyle\int e^{\ln x}dx$

78. $\displaystyle\int \frac{(x-1)dx}{(x^2+1)(x+1)}$

79. $\displaystyle\int \cos(x)\ln(\sin(x))\,dx$

80. $\displaystyle\int \frac{\sqrt{x}\,dx}{x+1}$

81. $\displaystyle\int (\sqrt{\ln x}/x)\,dx$

82. $\displaystyle\int x^2 e^x\,dx$

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

84. $\displaystyle\int \frac{\ln(\ln x)}{x}dx$