Faculty of Science
Department of Mathematics and Statistics

Math 251

Worksheet 13
[Integration]

Determine each of the following integrals:

1. $\displaystyle\int \frac{1}{1 + \sin x} dx$

2. $\displaystyle\int \frac{1}{1 - \sin x} dx$

3. $\displaystyle\int \frac{1}{1 + \cos x} dx$

4. $\displaystyle\int \frac{1}{1 - \cos x} dx$

5. $\displaystyle\int \frac{\sec^2 x + \sec x \tan x}{\sec x + \tan x} dx$

6. $\displaystyle\int \sec x \, dx$

7. $\displaystyle\int \frac{1}{x \ln x} dx$

8. $\displaystyle\int \frac{1}{\sqrt{x}\left(1 + \sqrt{x}\right)^2} dx$

9. $\displaystyle\int \theta \left(1 - 3\theta^2\right)^{\frac{1}{4}} d\theta$

10. $\displaystyle\int x^5 \sqrt{1 - x^2} \, dx$

11. $\displaystyle\int x \cos\left(3x^2\right) dx$

12. $\displaystyle\int e^{3x} dx$

13. $\displaystyle\int x^3 e^{x^4} dx$

14. $\displaystyle\int \frac{e^{\sqrt{x}}}{\sqrt{x}} dx$

15. $\displaystyle\int \frac{x^3}{\left(4 - x^4\right)^3} dx$

16. $\displaystyle\int \frac{\sin \sqrt{\theta}}{\sqrt{\theta \cos^3 \sqrt{\theta}}} d\theta$

17. $\displaystyle\int \sec^2 x \tan^2 x \, dx$

18. $\displaystyle\int \cot^7 x \, \csc^2 x \, dx$

19. $\displaystyle\int \frac{\cos x}{1 - \sin x} dx$

20. $\displaystyle\int \frac{e^x}{1 + e^x} dx$

21. $\displaystyle\int \frac{e^x + e^{-x}}{e^x - e^{-x}} dx$

22. $\displaystyle\int \sec^2 x \tan x \, dx$

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

24. $\displaystyle\int \sqrt{3 - 4x} \, dx$

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25. $\displaystyle\int \frac{y^2 + 4y - 4}{\sqrt{y^3 + 6y^2 - 12y + 9}}\, dy$

26. $\displaystyle\int \frac{2 + \ln x}{x + x \ln x}\, dx$

27. $\displaystyle\int \sin^2 x\, dx$

28. $\displaystyle\int \cos^2 x\, dx$

29. $\displaystyle\int \sin^3 x \cos^2 x\, dx$

30. $\displaystyle\int \cos^3 x\, dx$

31. $\displaystyle\int \frac{2x^3 + 3x^2 - 4x}{x^4 + 2x^3 - 4x^2 + 5}\, dx$

32. $\displaystyle\int \frac{\left(1 + t^{\frac{2}{3}}\right)^3}{t^{\frac{1}{3}}}\, dt$

33. $\displaystyle\int \tan^3 x \sec^3 x\, dx$

34. $\displaystyle\int \cos(2x)\, e^{(\sin 2x)}\, dx$

35. $\displaystyle\int (x - 1)\sqrt{x + 1}\, dx$

36. $\displaystyle\int x\sqrt{2 - 3x}\, dx$

37. $\displaystyle\int \left(\sec^4 x - \sec^2 x \tan^2 x\right) dx$

38. $\displaystyle\int e^{\cot 3x} \csc^2 3x\, dx$

39. $\displaystyle\int \frac{e^{\ln x}}{x}\, dx$

40. $\displaystyle\int \cot^2 x\, dx$

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

42. $\displaystyle\int \tan x\, dx$

43. $\displaystyle\int \cot 4x\, dx$

44. $\displaystyle\int \left(\sec^2 x - \tan^2 x\right) dx$

45. $\displaystyle\int \left(\csc^2 x - \cot^2 x\right) dx$

46. $\displaystyle\int \frac{x}{\sqrt{x^2 + 1}}\, dx$

47. $\displaystyle\int x^3 \sqrt{1 - x^2}\, dx$

48. $\displaystyle\int \sqrt{x} \sin\left(1 + x^{\frac{3}{2}}\right) dx$

49. $\displaystyle\int \frac{ax + b}{\sqrt{ax^2 + 2bx + c}}\, dx$

50. $\displaystyle\int \frac{\sec\theta \tan\theta}{1 + \sec\theta}\, d\theta$