

Math 251/249

Worksheet 15
[Tutorial Worksheet on Integration]

Determine each of the following integrals:

1. $\int \cos 3x dx$

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

3. $\int \sin^2 x \cos^2 x dx$

4. $\int \sin^2 x \cos^3 x dx$

5. $\int \tan x dx$

6. $\int \cot x dx$

7. $\int \csc x dx$

8. $\int \sin^3 x \cos^5 x dx$

9. $\int \frac{\cos \theta}{1 + \cos \theta} d\theta$

10. $\int \frac{\sin \theta}{1 - \sin \theta} d\theta$

11. $\int \sin x \sin 2x dx$

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

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

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

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

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

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

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

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

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

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

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

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

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

Math 251/249

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

25. $\int \frac{2 + \ln x}{x + x \ln x} dx$

26. $\int \sin^2 x dx$

27. $\int \cos^2 x dx$

28. $\int \sin^3 x \cos^2 x dx$

29. $\int \cos^3 x dx$

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

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

32. $\int \tan^3 x \sec^3 x dx$

33. $\int \cos(2x) e^{(\sin 2x)} dx$

34. $\int (x - 1) \sqrt{x + 1} dx$

35. $\int x \sqrt{2 - 3x} dx$

36. $\int (\sec^4 x - \sec^2 x \tan^2 x) dx$

37. $\int e^{\cot 3x} \csc^2 3x dx$

38. $\int \frac{e^{\ln x}}{x} dx$

39. $\int \cot^2 x dx$

40. $\int \tan^2 x dx$

41. $\int \tan x dx$

42. $\int \cot 4x dx$

43. $\int (\sec^2 x - \tan^2 x) dx$

44. $\int (\csc^2 x - \cot^2 x) dx$

45. $\int \frac{x}{\sqrt{x^2 + 1}} dx$

46. $\int x^3 \sqrt{1 - x^2} dx$

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

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

49. $\int \frac{\sec\theta \tan\theta}{1 + \sec\theta} dx$