

Integration by Parts

Evaluate the integrals in Exercises 1–24.

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

2. $\int \theta \cos \pi\theta d\theta$

3. $\int t^2 \cos t dt$

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

5. $\int_1^2 x \ln x dx$

6. $\int_1^e x^3 \ln x dx$

7. $\int \tan^{-1} y dy$

8. $\int \sin^{-1} y dy$

9. $\int x \sec^2 x dx$

10. $\int 4x \sec^2 2x dx$

11. $\int x^3 e^x dx$

12. $\int p^4 e^{-p} dp$

13. $\int (x^2 - 5x)e^x dx$

15. $\int x^5 e^x dx$

17. $\int_0^{\pi/2} \theta^2 \sin 2\theta d\theta$

19. $\int_{2/\sqrt{3}}^2 t \sec^{-1} t dt$

21. $\int e^\theta \sin \theta d\theta$

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

14. $\int (r^2 + r + 1)e^r dr$

16. $\int t^2 e^{4t} dt$

18. $\int_0^{\pi/2} x^3 \cos 2x dx$

20. $\int_0^{1/\sqrt{2}} 2x \sin^{-1}(x^2) dx$

22. $\int e^{-y} \cos y dy$

24. $\int e^{-2x} \sin 2x dx$

Substitution and Integration by Parts

Evaluate the integrals in Exercises 25–30 by using a substitution prior to integration by parts.

$$25. \int e^{\sqrt{3s+9}} ds$$

$$27. \int_0^{\pi/3} x \tan^2 x dx$$

$$29. \int \sin(\ln x) dx$$

$$26. \int_0^1 x \sqrt{1-x} dx$$

$$28. \int \ln(x + x^2) dx$$

$$30. \int z(\ln z)^2 dz$$