

INTEGRATION BY PARTS

NUTM Nexus Writing Team

May 2, 2025

1 Examples and Class Work

1. Solve $\int x e^x \, dx$.
2. Solve $\int x e^{2x} \, dx$.
3. Solve $\int x^2 \ln x \, dx$.
4. Solve $\int x^2 e^x \, dx$.

2 Practice Problems

Evaluate the following indefinite integrals using Integration by Parts:

5. $\int x e^{3x} \, dx$
6. $\int x^2 e^{3x} \, dx$
7. $\int x \ln(2x) \, dx$
8. $\int \ln(4x) \, dx$
9. $\int x e^{-3x} \, dx$
10. $\int x^2 e^{-x} \, dx$
11. $\int x^2 e^{-2x} \, dx$
12. $\int x^2 e^{2x} \, dx$
13. $\int \ln(2x) \, dx$

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

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

16. $\int x^3 \ln x \, dx$

17. $\int x e^x \, dx$

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

19. $\int x^2 e^{-x} \, dx$

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

21. $\int x^3 e^x \, dx$

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

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

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

25. $\int x^5 e^x \, dx$

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