Integration Problem Set

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Techniques:

1. Definite Integrals
2. Indefinite Integrals
3. Improper Integrals
4. U-Substitution
5. Integration by Parts
6. Partial Fractions
7. Improper Integrals
8. Reduction Formulas

Instructions

Solve the following integrals using appropriate techniques. Clearly state the method used and show all steps in your solution.

Problem Set

1. $$\int x \sin(x^2)\, dx$$
2. $$\int \frac{x}{\sqrt{x^2+4}}\, dx$$
3. $$\int (2x+1)e^{x^2+x}\, dx$$
4. $$\int \frac{x}{1+x^2}\, dx$$
5. $$\int_0^{\frac{\pi}{2}} \cos^2(x)\, dx$$
6. $$\int_1^4 \frac{1}{x+2}\, dx$$

7. $$\int_0^1 e^{x^2}\,dx$$

8. $$\int_{-1}^1 x^3\cos(x)\,dx$$

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

10. $$\int \frac{x}{\sqrt{x^2+4}}\,dx$$

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

12. $$\int \frac{x}{1+x^2}\,dx$$

13. $$\int xe^x\,dx$$

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

15. $$\int x^2e^x\,dx$$

16. $$\int \arctan(x)\,dx$$

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

18. $$\int \frac{x+1}{x^2-x-6}\,dx$$

19. $$\int \frac{3x^2+5x+2}{(x-1)(x+1)(x+3)}\,dx$$

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

21. $$\int_1^\infty \frac{1}{x^2}\,dx$$

22. $$\int_0^\infty e^{-x}\,dx$$

23.
$$\int_0^1 \frac{1}{\sqrt{1-x^2}}\,dx$$

24.
$$\int_{-\infty}^0 e^x\,dx$$

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

26.
$$\int \cos^n(x)\,dx$$

27.
$$\int x^n e^{-x}\,dx$$

28.
$$\int x^n \ln(x)\,dx$$

29.
$$\int_1^\infty \frac{1}{x^3}\,dx$$

30.
$$\int_0^\infty e^{-x}\cos(x)\,dx$$

31.
$$\int_0^1 \frac{1}{\sqrt{1-x^2}}\,dx$$

32.
$$\int_{-\infty}^0 e^x\,dx$$

33.
$$\int_0^\infty \frac{\sin x}{x}\,dx$$

34.
$$\int_0^1 \frac{x-1}{\ln x}\,dx$$

35.
$$\int_{-\infty}^\infty \frac{\cos x}{x^2+2}\,dx$$

36.
$$\int_0^1 \frac{\sin\ln x}{\ln x}\,dx$$

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