



Chapter 6 Multiple-Choice Practice Test

Directions: This practice test features multiple-choice questions based on the content in Chapter 6: Integration Techniques.

- 6.1:** Integration by Parts
- 6.2:** Trigonometric Integrals
- 6.3:** Trigonometric Substitution
- 6.4:** Integration by Partial Fractions
- 6.5:** Improper Integrals

For each question, select the best answer provided and do your figuring in the margins. If you encounter difficulties with a question, then move on and return to it later. Follow these guidelines:

- Do not use a calculator of any kind. All of these problems are designed to contain simple numbers.
- Adhere to the time limit of 90 minutes.
- After you complete all the questions, compare your responses to the answer key on the last page. Note any topics that require revision.

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Integration Techniques

Number of Questions—50

NO CALCULATOR

1. $\int_{-4}^5 \frac{1}{(x+2)^2} dx$ is

(A) $-\frac{9}{14}$

(B) $-\frac{5}{14}$

(C) $\frac{5}{14}$

(D) $\frac{9}{14}$

(E) divergent

2. The best substitution for evaluating $\int \frac{1}{x^2 \sqrt{9x^2 - 25}} dx$ is

(A) $x = \frac{3}{5} \sin \theta$

(B) $x = \frac{3}{5} \sec \theta$

(C) $x = \frac{5}{3} \sin \theta$

(D) $x = \frac{5}{3} \tan \theta$

(E) $x = \frac{5}{3} \sec \theta$

3. When the rational function $f(x) = \frac{x^3 + 6}{x^2(5x^2 - 7x + 4)(x^2 - 8x - 9)}$ is decomposed into partial fractions, there are
- (A) 4 fractions and 4 unknown constants
 - (B) 4 fractions and 5 unknown constants
 - (C) 5 fractions and 5 unknown constants
 - (D) 5 fractions and 6 unknown constants
 - (E) 6 fractions and 6 unknown constants

4. $\int \sec^4 x \tan^{12} x \, dx =$

(A) $\frac{1}{13} \tan^{13} x + C$

(B) $\frac{1}{15} \tan^{15} x + C$

(C) $\frac{1}{15} \sec^{15} x + C$

(D) $\frac{1}{15} \tan^{15} x + \frac{1}{13} \tan^{13} x + C$

(E) $\frac{1}{15} \sec^{15} x + \frac{1}{13} \sec^{13} x + C$

5. $\int_1^3 x e^x \, dx =$

(A) $4e^3 - 2e$

(B) $3e^3 - e - 2$

(C) $2e^3 - 2$

(D) $2e^3$

(E) $4e^3$

6. Consider the family of functions $f(x) = \frac{c}{x^2}$ where c is a positive constant. Which of the following integrals are improper?

I. $\int_1^{\infty} f(x) \, dx$

II. $\int_{-\infty}^{-1} f(x) \, dx$

III. $\int_{-1}^1 f(x) \, dx$

- (A) I only
- (B) II only
- (C) III only
- (D) I and II only
- (E) I, II, and III

7. Which integration technique is most appropriate for evaluating $\int x^3 \sqrt[5]{x} dx$?

- (A) Trigonometric substitution
- (B) Integration by Parts
- (C) Partial fraction decomposition
- (D) The Substitution Rule
- (E) None of the above

8. $\int \cos^5 \theta d\theta =$

- (A) $-\frac{1}{5} \sin^5 \theta + \frac{2}{3} \sin^3 \theta - \sin \theta + C$
- (B) $-\frac{1}{5} \cos^5 \theta + \frac{2}{3} \cos^3 \theta - \cos \theta + C$
- (C) $\frac{1}{5} \sin^5 \theta - \frac{2}{3} \sin^3 \theta + \sin \theta + C$
- (D) $\frac{1}{5} \cos^5 \theta - \frac{2}{3} \cos^3 \theta + \cos \theta + C$
- (E) $\frac{1}{6} \sin^6 \theta + C$

9. $\int \sin^3 \theta \cos^2 \theta \, d\theta =$

(A) $-\frac{1}{5} \sin^5 \theta + \frac{1}{3} \sin^3 \theta + C$

(B) $-\frac{1}{5} \cos^5 \theta + \frac{1}{3} \cos^3 \theta + C$

(C) $\frac{1}{5} \sin^5 \theta - \frac{1}{3} \sin^3 \theta + C$

(D) $\frac{1}{5} \cos^5 \theta - \frac{1}{3} \cos^3 \theta + C$

(E) $\frac{1}{5} \cos^5 \theta + \frac{1}{3} \cos^3 \theta + C$

10. $\int_{-\infty}^{-4} \frac{2}{x^3} \, dx$ is

(A) $-\frac{1}{32}$

(B) $-\frac{1}{16}$

(C) $-\frac{1}{8}$

(D) $-\frac{1}{4}$

(E) divergent

11. $\int \frac{1}{x^2 - 4} dx =$

(A) $\frac{1}{4} \ln |(x+2)(x-2)| + C$

(B) $\frac{1}{4} \ln \left| \frac{x-2}{x+2} \right| + C$

(C) $\frac{1}{4} \ln \left| \frac{x+2}{x-2} \right| + C$

(D) $\frac{1}{2} \ln \left| \frac{x-2}{x+2} \right| + C$

(E) $\frac{1}{2} \ln \left| \frac{x+2}{x-2} \right| + C$

12. $\int \sin^2 4t \, dt =$

(A) $-\frac{1}{16} \cos 8t + C$

(B) $\frac{t}{2} - \frac{1}{16} \sin 8t + C$

(C) $\frac{t}{2} + \frac{1}{16} \sin 8t + C$

(D) $\frac{t}{2} - \frac{1}{16} \cos 8t + C$

(E) $\frac{t}{2} + \frac{1}{16} \cos 8t + C$

13. $\int x^6 \ln x \, dx =$

(A) $x^6 \ln x + \frac{x^7}{49} + C$

(B) $x^6 \ln x - \frac{x^7}{49} + C$

(C) $\frac{x^7}{7} \ln x - \frac{x^6}{6} + C$

(D) $\frac{x^7}{7} \ln x - \frac{x^7}{49} + C$

(E) $\frac{x^7}{7} \ln x + \frac{x^7}{49} + C$

14. $\int_0^{\infty} \cos x \, dx$ is

(A) -1

(B) 0

(C) 1

(D) $\frac{\pi}{2}$

(E) divergent

15. $\int x \sec x \tan x \, dx =$

(A) $x \sec x + \sec x \tan x + C$

(B) $x \sec x - \sec x \tan x + C$

(C) $x \sec x + \ln |\sec x + \tan x| + C$

(D) $x \sec x - \ln |\sec x + \tan x| + C$

(E) $x \sec x \tan x - \ln |\sec x + \tan x| + C$

16. $\int \tan^6 x \cos^9 x \, dx =$

(A) $-\frac{1}{9} \sin^9 x + C$

(B) $-\frac{1}{9} \sin^9 x - \frac{1}{7} \sin^7 x + C$

(C) $-\frac{1}{9} \sin^9 x + \frac{1}{7} \sin^7 x + C$

(D) $\frac{1}{9} \sin^9 x + \frac{1}{7} \sin^7 x + C$

(E) $\frac{1}{9} \sin^9 x - \frac{1}{7} \sin^7 x + C$

17. $\int_0^1 \frac{1}{\sqrt[3]{x}} \, dx$ is

(A) $-\frac{3}{2}$

(B) $-\frac{2}{3}$

(C) $\frac{2}{3}$

(D) $\frac{3}{2}$

(E) divergent

18. Two continuous functions f and g satisfy $0 < g(x) \leq f(x)$. Which statements must be true?

- I. If $\int_1^{\infty} f(x) \, dx$ diverges, then $\lim_{k \rightarrow \infty} \int_1^k f(x) \, dx = \infty$.
- II. If $\int_1^{\infty} g(x) \, dx$ diverges, then $\int_1^{\infty} f(x) \, dx$ also diverges.
- III. If $\int_1^{\infty} g(x) \, dx$ converges, then $\int_1^{\infty} f(x) \, dx$ also converges.

- (A) I only
- (B) II only
- (C) I and II only
- (D) II and III only
- (E) I, II, and III

19. $\int \sin 7x \sin 3x dx =$

(A) $-\frac{1}{8} \cos 4x - \frac{1}{20} \cos 10x + C$

(B) $-\frac{1}{8} \cos 4x + \frac{1}{20} \cos 10x + C$

(C) $\frac{1}{8} \cos 4x - \frac{1}{20} \cos 10x + C$

(D) $\frac{1}{8} \sin 4x - \frac{1}{20} \sin 10x + C$

(E) $\frac{1}{8} \sin 4x + \frac{1}{20} \sin 10x + C$

20. $\frac{1}{x^3 + 4x^2 + 8x} =$

(A) $-\frac{1}{8x} - \frac{5}{8(x^2 + 4x + 8)}$

(B) $\frac{1}{8x} - \frac{5}{8(x^2 + 4x + 8)}$

(C) $\frac{1}{8x} - \frac{x - 4}{8(x^2 + 4x + 8)}$

(D) $\frac{1}{8x} - \frac{x + 4}{8(x^2 + 4x + 8)}$

(E) $\frac{1}{8x} + \frac{x + 4}{8(x^2 + 4x + 8)}$

21. $\int \sin 3x \cos 2x \, dx =$

(A) $-\frac{1}{10} \cos 5x - \frac{1}{2} \cos x + C$

(B) $-\frac{1}{10} \sin 5x - \frac{1}{2} \sin x + C$

(C) $\frac{1}{10} \cos 5x + \frac{1}{2} \cos x + C$

(D) $\frac{1}{10} \sin 5x + \frac{1}{2} \sin x + C$

(E) $\frac{1}{10} \sin 5x - \frac{1}{2} \sin x + C$

22. $\int_0^{\infty} \frac{1}{x^2 + 81} \, dx$ is

(A) $\frac{\pi}{162}$

(B) $\frac{\pi}{81}$

(C) $\frac{\pi}{18}$

(D) $\frac{\pi}{9}$

(E) divergent

23. $\int \frac{2x+1}{x^2+8x+16} dx =$

(A) $-7\ln|x+4| - \frac{2}{x+4} + C$

(B) $-2\ln|x+4| - \frac{7}{x+4} + C$

(C) $2\ln|x+4| - \frac{7}{x+4} + C$

(D) $2\ln|x+4| + \frac{7}{x+4} + C$

(E) $7\ln|x+4| + \frac{2}{x+4} + C$

24. $\int_{-1}^{\infty} e^{-6x} dx$ is

(A) $\frac{1}{6}$

(B) 1

(C) $\frac{e^6}{6}$

(D) e^6

(E) divergent

25. $\int_0^4 \frac{1}{2x^2 + 7x + 5} dx =$

(A) $\frac{1}{3} \ln \left(\frac{5}{13} \right)$

(B) $\frac{1}{3} \ln \left(\frac{13}{25} \right)$

(C) $\frac{1}{3} \ln \left(\frac{25}{13} \right)$

(D) $\frac{1}{3} \ln 5 + \frac{2}{3} \ln \left(\frac{5}{13} \right)$

(E) $\frac{1}{3} \ln 5 + \frac{2}{3} \ln \left(\frac{13}{5} \right)$

26. $\int \cos 12x \cos 14x \, dx =$

(A) $-\frac{1}{52} \sin 26x - \frac{1}{4} \sin 2x + C$

(B) $-\frac{1}{52} \cos 26x - \frac{1}{4} \cos 2x + C$

(C) $\frac{1}{52} \sin 26x - \frac{1}{4} \sin 2x + C$

(D) $\frac{1}{52} \sin 26x + \frac{1}{4} \sin 2x + C$

(E) $\frac{1}{52} \cos 26x + \frac{1}{4} \cos 2x + C$

27. $\int x \cos 9x \, dx =$

(A) $\frac{1}{9}x \sin 9x - \frac{1}{81} \cos 9x + C$

(B) $\frac{1}{9}x \sin 9x + \frac{1}{81} \cos 9x + C$

(C) $\frac{1}{9}x \sin 9x + \frac{1}{9} \cos 9x + C$

(D) $x \cos 9x + \frac{1}{81} \cos 9x + C$

(E) $x \cos 9x - \frac{1}{81} \cos 9x + C$

28. $\int \sec^3 x \tan^5 x \, dx =$

(A) $-\frac{1}{8}\tan^8 x + \frac{1}{6}\tan^6 x + C$

(B) $-\frac{1}{7}\sec^7 x + \frac{2}{5}\sec^5 x - \frac{1}{3}\sec^3 x + C$

(C) $-\frac{1}{7}\tan^7 x + \frac{2}{5}\tan^5 x - \frac{1}{3}\tan^3 x + C$

(D) $\frac{1}{7}\sec^7 x - \frac{2}{5}\sec^5 x + \frac{1}{3}\sec^3 x + C$

(E) $\frac{1}{7}\tan^7 x - \frac{2}{5}\tan^5 x + \frac{1}{3}\tan^3 x + C$

29. $\int \frac{1}{x^3 + 8x^2} dx =$

(A) $-\frac{1}{8x} + \frac{1}{64} \ln |x^2 + 8x| + C$

(B) $-\frac{1}{8x} + \frac{1}{64} \ln \left| \frac{x+8}{x} \right| + C$

(C) $-\frac{1}{8x} + \frac{1}{64} \ln \left| \frac{x}{x+8} \right| + C$

(D) $\frac{1}{8x} + \frac{1}{64} \ln \left| \frac{x+8}{x} \right| + C$

(E) $\frac{1}{8x} + \frac{1}{64} \ln \left| \frac{x}{x+8} \right| + C$

30. $\int_1^{\infty} \frac{1}{x^{6s+2}} dx$ diverges for

(A) $s > -\frac{1}{6}$ (B) $s < -\frac{1}{6}$ (C) $s \leq -\frac{1}{6}$ (D) $s < -\frac{1}{3}$ (E) $s \leq -\frac{1}{3}$

31. Let f and g be twice-differentiable functions such that $f(2) = 5$, $f(7) = 8$, $g(2) = 4$, and $g(7) = -3$.

If $\int_2^7 f'(x)g(x) \, dx = 12$, then $\int_2^7 f(x)g'(x) \, dx =$

- (A) -56 (B) -32 (C) -16 (D) 0 (E) 8

32. $\int \csc^{11} x \cot^3 x \, dx =$

- (A) $-\frac{1}{13} \cot^{13} x - \frac{1}{11} \cot^{11} x + C$
(B) $-\frac{1}{13} \cot^{13} x + \frac{1}{11} \cot^{11} x + C$
(C) $-\frac{1}{13} \csc^{13} x + \frac{1}{11} \csc^{11} x + C$
(D) $\frac{1}{13} \cot^{13} x - \frac{1}{11} \cot^{11} x + C$
(E) $\frac{1}{13} \csc^{13} x - \frac{1}{11} \csc^{11} x + C$

33. $\frac{x^3}{x^2 - 4x - 5} =$

(A) $x + 4 - \frac{125}{6(x+1)} + \frac{1}{6(x-5)}$

(B) $x + 4 + \frac{125}{6(x+1)} + \frac{1}{6(x-5)}$

(C) $x + 4 - \frac{1}{6(x+1)} + \frac{125}{6(x-5)}$

(D) $x + 4 - \frac{1}{6(x+1)} - \frac{125}{6(x-5)}$

(E) $x + 4 + \frac{1}{6(x+1)} + \frac{125}{6(x-5)}$

34. $\int \csc^4 \theta \cot^9 \theta \, d\theta =$

(A) $-\frac{1}{12} \cot^{12} \theta - \frac{1}{10} \cot^{10} \theta + C$

(B) $-\frac{1}{12} \csc^{12} \theta - \frac{1}{10} \csc^{10} \theta + C$

(C) $\frac{1}{12} \cot^{12} \theta + \frac{1}{10} \cot^{10} \theta + C$

(D) $\frac{1}{12} \cot^{12} \theta - \frac{1}{10} \cot^{10} \theta + C$

(E) $\frac{1}{12} \csc^{12} \theta + \frac{1}{10} \csc^{10} \theta + C$

35. $\int \frac{5}{x^3 - 9x} dx =$

(A) $-\frac{5}{18} \ln|x| - \frac{5}{9} \ln|x^2 - 9| + C$

(B) $-\frac{5}{18} \ln|x| + \frac{5}{9} \ln|x^2 - 9| + C$

(C) $-\frac{5}{9} \ln|x| + \frac{5}{18} \ln|x^2 - 9| + C$

(D) $\frac{5}{18} \ln|x| + \frac{5}{9} \ln|x^2 - 9| + C$

(E) $\frac{5}{9} \ln|x| - \frac{5}{18} \ln|x^2 - 9| + C$

36. $\int \sin^{-1} 8x \, dx =$

(A) $x \sin^{-1} 8x + \frac{1}{8} \sin^{-1} 8x + C$

(B) $x \sin^{-1} 8x + \frac{\sqrt{1-64x^2}}{8} + C$

(C) $x \sin^{-1} 8x - \frac{\sqrt{1-64x^2}}{8} + C$

(D) $\frac{x\sqrt{1-64x^2}}{8} + \frac{\sqrt{1-64x^2}}{8} + C$

(E) $\frac{x\sqrt{1-64x^2}}{8} - \frac{\sqrt{1-64x^2}}{8} + C$

37. $\int \frac{1}{x\sqrt{x^2+81}} dx =$

(A) $-\frac{1}{9} \ln \left| \frac{\sqrt{x^2+81}}{x} + \frac{9}{x} \right| + C$

(B) $-\frac{1}{9} \ln \left| \frac{x}{\sqrt{x^2+81}} + \frac{x}{9} \right| + C$

(C) $-\frac{1}{81} \ln \left| \frac{\sqrt{x^2+81}}{x} + \frac{9}{x} \right| + \frac{1}{81} \left(\frac{9}{\sqrt{x^2+81}} \right) + C$

(D) $-\frac{1}{81} \ln \left| \frac{x}{\sqrt{x^2+81}} + \frac{x}{9} \right| + \frac{1}{81} \left(\frac{\sqrt{x^2+81}}{9} \right) + C$

(E) $\ln \left| \frac{\sqrt{x^2+81}}{9} + \frac{x}{9} \right| + C$

38. $\int \frac{x^3}{\sqrt{x^2-4}} dx =$

(A) $\ln \left| \frac{x}{2} + \frac{\sqrt{x^2-4}}{2} \right| + C$

(B) $\frac{64}{3(x^2-4)^{3/2}} + \frac{16}{\sqrt{x^2-4}} + C$

(C) $\frac{(x^2-4)^{3/2}}{3} + 4\sqrt{x^2-4} + C$

(D) $\frac{(x^2-4)^{3/2}}{3} + \frac{4}{\sqrt{x^2-4}} + C$

(E) $\frac{3(x^2-4)^{3/2}}{64} + \frac{\sqrt{x^2-4}}{16} + C$

39. $\int \ln(x^9) \, dx =$

(A) $9\ln x - 9x + C$

(B) $9x\ln x + 9x + C$

(C) $9x\ln x - 9x + C$

(D) $9x\ln x + 9\ln x + C$

(E) $9x\ln x - 9\ln x + C$

40. $\int \frac{1}{\sin^3 \theta \cos \theta} \, d\theta =$

(A) $-\csc 2\theta \cot 2\theta - \frac{1}{2} \csc^2 \theta + C$

(B) $-\csc 2\theta \cot 2\theta + \frac{1}{2} \csc^2 \theta + C$

(C) $-\ln |\csc 2\theta + \cot 2\theta| + \frac{1}{2} \csc^2 \theta + C$

(D) $-\ln |\csc 2\theta + \cot 2\theta| - \frac{1}{2} \csc^2 \theta + C$

(E) $\ln |\csc 2\theta + \cot 2\theta| + \frac{1}{2} \csc^2 \theta + C$

41. $\int \sec^6 5x \, dx =$

(A) $-\frac{1}{25} \tan^5 5x - \frac{2}{15} \tan^3 5x - \frac{1}{5} \tan 5x + C$

(B) $\frac{1}{25} \tan^5 5x + \frac{2}{15} \tan^3 5x + \frac{1}{5} \tan 5x + C$

(C) $\frac{1}{25} \sec^5 5x + \frac{2}{15} \sec^3 5x + \frac{1}{5} \sec 5x + C$

(D) $\frac{1}{5} \sec^5 5x + \frac{2}{3} \sec^3 5x + \sec 5x + C$

(E) $\frac{1}{5} \tan^5 5x + \frac{2}{3} \tan^3 5x + \tan 5x + C$

42. $\int (3x+7)(x-2)^6 dx =$

(A) $\frac{1}{7}(3x+7)(x-2)^7 + \frac{3}{49}(x-2)^7 + C$

(B) $\frac{1}{7}(3x+7)(x-2)^7 - \frac{3}{49}(x-2)^7 + C$

(C) $\frac{1}{7}(3x+7)(x-2)^7 - \frac{3}{49}(x-2)^8 + C$

(D) $\frac{1}{7}(3x+7)(x-2)^7 + \frac{3}{56}(x-2)^8 + C$

(E) $\frac{1}{7}(3x+7)(x-2)^7 - \frac{3}{56}(x-2)^8 + C$

43. $\int \frac{x}{\sqrt{x^2 - 8x + 20}} dx =$

(A) $\frac{x^2}{8} + x - 6 + C$

(B) $2\sqrt{x^2 - 8x + 20} + C$

(C) $\frac{2x - 6}{\sqrt{x^2 - 8x + 20}} + C$

(D) $4\ln \left| \frac{\sqrt{x^2 - 8x + 20}}{2} + \frac{x - 4}{2} \right| + C$

(E) $4\ln \left| \frac{\sqrt{x^2 - 8x + 20}}{2} + \frac{x - 4}{2} \right| + \sqrt{x^2 - 8x + 20} + C$

44. $\int_2^\infty \frac{1}{x \ln 6x} dx$ is

(A) $-\ln(\ln 12)$ (B) $-\frac{1}{\ln 12}$ (C) $\frac{1}{\ln 12}$ (D) $\ln(\ln 12)$ (E) divergent

45. Which choice is true about the convergence or divergence of $\int_1^{\infty} \frac{\sin^2 x}{x^4} dx$?

(A) Since $0 \leq \frac{\sin^2 x}{x^4} \leq \frac{1}{x^4}$ and $\int_1^{\infty} \frac{1}{x^4} dx$ converges, $\int_1^{\infty} \frac{\sin^2 x}{x^4} dx$ converges.

(B) Since $0 \leq \frac{\sin^2 x}{x^4} \leq \frac{1}{x^4}$ and $\int_1^{\infty} \frac{1}{x^4} dx$ diverges, $\int_1^{\infty} \frac{\sin^2 x}{x^4} dx$ converges.

(C) Since $0 \leq \frac{\sin^2 x}{x^4} \leq \frac{1}{x^4}$ and $\int_1^{\infty} \frac{1}{x^4} dx$ diverges, $\int_1^{\infty} \frac{\sin^2 x}{x^4} dx$ diverges.

(D) Since $\frac{\sin^2 x}{x^4} \geq \frac{1}{x^4} \geq 0$ and $\int_1^{\infty} \frac{1}{x^4} dx$ converges, $\int_1^{\infty} \frac{\sin^2 x}{x^4} dx$ converges.

(E) Since $\frac{\sin^2 x}{x^4} \geq \frac{1}{x^4} \geq 0$ and $\int_1^{\infty} \frac{1}{x^4} dx$ diverges, $\int_1^{\infty} \frac{\sin^2 x}{x^4} dx$ diverges.

46. $\int x^2 e^{-4x} dx =$

(A) $-\frac{1}{4}x^2 e^{-4x} - \frac{1}{8}x e^{-4x} - \frac{1}{32}e^{-4x} + C$

(B) $-\frac{1}{4}x^2 e^{-4x} + \frac{1}{8}x e^{-4x} - \frac{1}{32}e^{-4x} + C$

(C) $-\frac{1}{4}x^2 e^{-4x} + \frac{1}{8}x e^{-4x} + \frac{1}{32}e^{-4x} + C$

(D) $\frac{1}{4}x^2 e^{-4x} + \frac{1}{8}x e^{-4x} + \frac{1}{32}e^{-4x} + C$

(E) $\frac{1}{4}x^2 e^{-4x} - \frac{1}{8}x e^{-4x} + \frac{1}{32}e^{-4x} + C$

47. $\int \frac{1}{x^4 - 16} dx =$

(A) $-\frac{1}{16} \tan^{-1} \left(\frac{x}{2} \right) + \frac{1}{32} \ln \left| \frac{x-2}{x+2} \right| + C$

(B) $-\frac{1}{16} \tan^{-1} \left(\frac{x}{2} \right) - \frac{1}{32} \ln \left| \frac{x-2}{x+2} \right| + C$

(C) $-\frac{1}{8} \tan^{-1} \left(\frac{x}{2} \right) + \frac{1}{32} \ln \left| \frac{x-2}{x+2} \right| + C$

(D) $\frac{1}{16} \tan^{-1} \left(\frac{x}{2} \right) + \frac{1}{32} \ln \left| \frac{x-2}{x+2} \right| + C$

(E) $\frac{1}{16} \tan^{-1} \left(\frac{x}{2} \right) - \frac{1}{32} \ln \left| \frac{x-2}{x+2} \right| + C$

48. $\int e^{3x} \cos x dx =$

(A) $-\frac{1}{10}e^{3x} \sin x - \frac{3}{10}e^{3x} \cos x + C$

(B) $\frac{1}{10}e^{3x} \sin x + \frac{3}{10}e^{3x} \cos x + C$

(C) $\frac{1}{10}e^{3x} \sin x - \frac{3}{10}e^{3x} \cos x + C$

(D) $\frac{1}{10}e^{3x} \sin x + \frac{3}{10}e^{3x} \sin x + C$

(E) $\frac{1}{10}e^{3x} \sin x - \frac{3}{10}e^{3x} \sin x + C$

49. $\int \frac{e^x}{e^{2x} + 7e^x - 8} dx =$

(A) $\frac{1}{9} \ln \left| \frac{x-1}{x+8} \right| + C$

(B) $\frac{1}{9} \ln \left| \frac{x+8}{x-1} \right| + C$

(C) $\frac{1}{9} \ln \left| \frac{e^x - 1}{e^x + 8} \right| + C$

(D) $\frac{1}{9} \ln \left| \frac{e^x + 8}{e^x - 1} \right| + C$

(E) $\frac{1}{9} \ln |(e^x + 8)(e^x - 1)| + C$

50. $\int x^7 e^{x^4} dx =$

(A) $x^4 e^{x^4} - e^{x^4} + C$

(B) $x^4 e^{x^4} + e^{x^4} + C$

(C) $\frac{x^4}{4} e^{x^4} + \frac{e^{x^4}}{4} + C$

(D) $\frac{x^4}{4} e^{x^4} - \frac{e^{x^4}}{4} + C$

(E) $\frac{x^4}{4} e^{x^4} - e^{x^4} + C$

This marks the end of the test. The following page contains the answers to all the questions.

- | | |
|-------|-------|
| 1. E | 33. E |
| 2. E | 34. A |
| 3. D | 35. C |
| 4. D | 36. B |
| 5. D | 37. A |
| 6. E | 38. C |
| 7. E | 39. C |
| 8. C | 40. D |
| 9. D | 41. B |
| 10. B | 42. E |
| 11. B | 43. E |
| 12. B | 44. E |
| 13. D | 45. A |
| 14. E | 46. A |
| 15. D | 47. A |
| 16. C | 48. B |
| 17. D | 49. C |
| 18. C | 50. D |
| 19. D | |
| 20. D | |
| 21. A | |
| 22. C | |
| 23. D | |
| 24. C | |
| 25. C | |
| 26. D | |
| 27. B | |
| 28. D | |
| 29. B | |
| 30. C | |
| 31. A | |
| 32. C | |