

Integrals — CBSE Pattern Test 2

Class 12 Maths · 90 minutes · 40 marks · Sections A–D with answer key · Narayan Gurukul Academy

Test 2 — CBSE Pattern (90 minutes, 40 marks)

Class 12 Maths · Integrals · Narayan Gurukul Academy (ClassApna)

General Instructions: (1) This paper has four sections — Section A (1×10), Section B (2×4), Section C (3×4) and Section D (5×2) — total 40 marks. Time allowed: 90 minutes.

(2) All questions are compulsory. No overall choice is given; internal choice, where allowed, is clearly marked.

(3) For MCQ questions choose the single correct option; for VSA answers write a single line.

(4) Take $g = 10 \text{ m/s}^2$. All symbols carry their usual meaning. Use of a calculator is not permitted.

Section A — MCQ & VSA ($10 \times 1 = 10$ marks)

- The substitution method is used to
 - simplify the integrand
 - differentiate functions
 - find limits
 - solve determinants
- $\int 2x(x^2 + 1)^5 dx$ is best solved by substituting
 - $u = x^2 + 1$
 - $u = 2x$
 - $u = x^5$
 - $u = x$
- Partial fractions are used to integrate
 - rational functions
 - trigonometric functions
 - exponential functions
 - constants
- For $\int x e^x dx$, we take $u =$
 - x
 - e^x
 - $x e^x$
 - 1
- The ILATE rule is used to
 - choose the first function
 - choose the constant
 - find limits
 - simplify fractions
- $\int \log x dx$ equals
 - $x \log x - x + C$
 - $x \log x + C$
 - $\log x + C$
 - $1/x + C$
- $\int_a^a f(x) dx$ equals
 - 0

- (B) 1
 (C) $f(a)$
 (D) $2f(a)$
8. $\int_a^b f(x) dx = -\int_b^a f(x) dx$ is a property of
 (A) definite integrals
 (B) indefinite integrals
 (C) derivatives
 (D) limits
9. Write $\int \cos x dx$.
10. What are partial fractions used for?

Section B — Short Answer I ($4 \times 2 = 8$ marks)

11. Write $\int e^x dx$.
12. Write $\int f'(x)/f(x) dx$.
13. Evaluate $\int x e^x dx$.
14. State the fundamental theorem of calculus.

Section C — Short Answer II ($4 \times 3 = 12$ marks)

15. Evaluate $\int (3x^2 + 2x) dx$.
16. Evaluate $\int (2x + 1)/(x^2 + x + 1) dx$.
17. Evaluate $\int \log x dx$.
18. Evaluate $\int_0^{\pi/2} \cos x dx$.

Section D — Long Answers ($2 \times 5 = 10$ marks)

19. Evaluate $\int (\sin x + \cos x) dx$. Evaluate $\int x \sin x dx$.
20. Evaluate $\int x/(x^2 + 1) dx$. Evaluate $\int_0^{\pi/2} \sin x dx$ using the fundamental theorem.

Answer Key (Marking Scheme)

- Q1 — (A) simplify the integrand. Q2 — (A) $u = x^2 + 1$. Q3 — (A) rational functions. Q4 — (A) x .
 Q5 — (A) choose the first function. Q6 — (A) $x \log x - x + C$. Q7 — (A) 0. Q8 — (A) definite integrals.
 Q9 — $\sin x + C$.
 Q10 — To integrate rational functions.
 Q11 — $e^x + C$.
 Q12 — $\log |f(x)| + C$.
 Q13 — $e^x(x - 1) + C$.
 Q14 — $\int_a^b f(x) dx = F(b) - F(a)$.
 Q15 — $x^3 + x^2 + C$.
 Q16 — $\log(x^2 + x + 1) + C$.
 Q17 — $x \log x - x + C$.
 Q18 — 1.
 Q19 — $-\cos x + \sin x + C$; $-x \cos x + \sin x + C$.

Q20 — $(1/2) \log(x^2 + 1) + C$; 1.