

Integrals — CBSE Pattern Test 1

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

Test 1 — 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)

1. $\int x^n dx$ equals

- (A) $x^{n+1}/(n+1) + C$, $n \neq -1$
- (B) $x^n/n + C$
- (C) $n x^{n-1} + C$
- (D) $x^{n+1} + C$

2. $\int (1/x) dx$ equals

- (A) $\log |x| + C$
- (B) $1/x^2 + C$
- (C) $x + C$
- (D) $-1/x^2 + C$

3. $\int \cos x dx$ equals

- (A) $\sin x + C$
- (B) $-\sin x + C$
- (C) $\cos x + C$
- (D) $-\cos x + C$

4. $\int e^x dx$ equals

- (A) $e^x + C$
- (B) $e^x/x + C$
- (C) $xe^x + C$
- (D) $\ln x + C$

5. $\int f'(x)/f(x) dx$ equals

- (A) $\log |f(x)| + C$
- (B) $f(x) + C$
- (C) $f'(x) + C$
- (D) $1/f(x) + C$

6. Integration by parts uses the formula

- (A) $\int u dv = uv - \int v du$
- (B) $\int u dv = uv + \int v du$
- (C) $\int u dv = \int u du$
- (D) $\int u dv = uv$

7. The fundamental theorem states $\int_a^b f(x) dx$ equals

- (A) $F(b) - F(a)$

- (B) $F(a) - F(b)$
 (C) $F(a) + F(b)$
 (D) $F(b)/F(a)$
8. $\int_0^{\pi/2} \sin x \, dx$ equals
 (A) 1
 (B) 0
 (C) -1
 (D) $\pi/2$
9. Write $\int x^n \, dx$.
10. Write the integration by parts formula.

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

11. Write $\int (1/x) \, dx$.
12. When is the substitution method used?
13. What does ILATE stand for?
14. Write the value of $\int_a^a f(x) \, dx$.

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

15. Evaluate $\int (x^2 + 1) \, dx$.
16. Evaluate $\int 2x/(x^2 + 1) \, dx$.
17. Evaluate $\int x \cos x \, dx$.
18. Evaluate $\int_0^1 x^2 \, dx$.

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

19. Evaluate $\int x^2 e^x \, dx$.
20. Evaluate $\int 1/(x^2 - 1) \, dx$ using partial fractions. Evaluate $\int_1^2 (x^2 + 1) \, dx$.

Answer Key (Marking Scheme)

- Q1 — (A) $x^{n+1}/(n+1) + C$. Q2 — (A) $\log |x| + C$. Q3 — (A) $\sin x + C$. Q4 — (A) $e^x + C$.
 Q5 — (A) $\log |f(x)| + C$. Q6 — (A) $\int u \, dv = uv - \int v \, du$. Q7 — (A) $F(b) - F(a)$. Q8 — (A) 1.
 Q9 — $x^{n+1}/(n+1) + C$, $n \neq -1$.
 Q10 — $\int u \, dv = uv - \int v \, du$.
 Q11 — $\log |x| + C$.
 Q12 — To simplify the integrand.
 Q13 — Inverse, Logarithmic, Algebraic, Trigonometric, Exponential.
 Q14 — 0.
 Q15 — $x^3/3 + x + C$.
 Q16 — $\log(x^2 + 1) + C$.
 Q17 — $x \sin x + \cos x + C$.
 Q18 — $1/3$.
 Q19 — $e^x(x^2 - 2x + 2) + C$.

Q20 — $(1/2) \log |(x - 1)/(x + 1)| + C$; $10/3$.