CLASS 12 MATHEMATICS EXTRA QUESTIONS

Class 12 Mathematics Chapter 7 Integrals – Extra Questions with Answers

Extra practice questions for Class 12 Maths Chapter 7 (Integrals), beyond the textbook. These Class 12 Mathematics Chapter 7 important questions are handy for last-minute exam practice.

Contents

Extra practice questions for Class 12 Maths Chapter 7 (Integrals), beyond the textbook. These Class 12 Mathematics Chapter 7 important questions are handy for last-minute exam practice.

Very Short Answer Questions (1 mark)

Q1. Evaluate $\int x^3 dx$.
Ans: $x^4/4+C$.

Q2. Evaluate $\int \sec^2 x\, dx$.
Ans: $\tan x+C$.

Q3. Evaluate $\int_0^1 2x\, dx$.
Ans: $[x^2]_0^1=1-0=1$.

Q4. State the formula for integration by parts.
Ans: $\int u\, dv=uv-\int v\, du$.

Q5. Evaluate $\int 1/x\, dx$.
Ans: $\log|x|+C$.

Short Answer Questions (2–3 marks)

Q6. Evaluate $\int x \cos x\, dx$ using integration by parts.
Ans: Let $u=x$, $dv=\cos x\, dx$, so $du=dx$, $v=\sin x$. $\int x\cos x\, dx=x\sin x-\int \sin x\, dx=x\sin x+\cos x+C$.

Q7. Evaluate $\int_0^{\pi/2} \sin x\, dx$.
Ans: $[-\cos x]_0^{\pi/2}=-\cos(\pi/2)-(-\cos 0)=0-(-1)=1$.

Q8. Evaluate $\int 2x/(1+x^2)\, dx$ using substitution.
Ans: Let $t=1+x^2$, $dt=2x\, dx$. Integral becomes $\int dt/t=\log|t|+C=\log|1+x^2|+C$.

Higher-Order Thinking / Application Questions

Q9. Evaluate $\int_0^{\pi/2} \sqrt{(\sin x)}/[\sqrt{(\sin x)}+\sqrt{(\cos x)}]\, dx$ using the property $\int_0^a f(x)dx=\int_0^a f(a-x)dx$.
Ans: Let $I=\int_0^{\pi/2} \sqrt{(\sin x)}/[\sqrt{(\sin x)}+\sqrt{(\cos x)}]\, dx$. Applying the property with $a=\pi/2$, replace x with $(\pi/2-x)$: $\sin(\pi/2-x)=\cos x$ and $\cos(\pi/2-x)=\sin x$, so $I=\int_0^{\pi/2} \sqrt{(\cos x)}/[\sqrt{(\cos x)}+\sqrt{(\sin x)}]\, dx$. Call this second expression I again (it equals the same I by the property, just rewritten). Adding the original I and this rewritten I: $2I=\int_0^{\pi/2}\{\sqrt{(\sin x)}/[\sqrt{(\sin x)}+\sqrt{(\cos x)}]+\sqrt{(\cos x)}/[\sqrt{(\cos x)}+\sqrt{(\sin x)}]\}dx=\int_0^{\pi/2}[\sqrt{(\sin x)}+\sqrt{(\cos x)}]/[\sqrt{(\sin x)}+\sqrt{(\cos x)}]\, dx=\int_0^{\pi/2} 1\, dx=\pi/2$. Therefore $2I=\pi/2$, giving $I=\pi/4$. This elegant technique — adding a definite integral to its $(a-x)$-substituted version to cancel the complicated denominator — is a standard trick for definite integrals with symmetric trigonometric structure.

Q10. Find the area bounded by the curve $y=x^2$ and the line $y=4$ using definite integrals, explaining the setup with a sketch description.
Ans: The parabola $y=x^2$ and the horizontal line $y=4$ intersect where $x^2=4$, i.e., $x=-2$ and $x=2$. Between these points, the line $y=4$ lies above the parabola $y=x^2$ (since e.g. at $x=0$, line value 4>parabola value 0). The bounded region is symmetric about the y-axis, resembling a shape between the upward parabola and the horizontal line capping it. The area is $\text{Area}=\int_{-2}^{2}(4-x^2)dx$ (top curve minus bottom curve, integrated over x). By symmetry, this equals $2\int_0^2(4-x^2)dx=2[4x-x^3/3]_0^2=2[(8-8/3)-0]=2[(24-8)/3]=2(16/3)=32/3$ square units. This demonstrates the general method for area between curves: identify intersection points as limits, subtract the lower function from the upper function, and integrate (using symmetry to simplify computation

where applicable).

Class 12 Mathematics Chapter 7 – Solutions and Notes

For complete step-by-step answers and a quick summary, check the Class 12 Mathematics Chapter 7 Solutions and Class 12 Mathematics Chapter 7 Revision Notes.

See also: Chapter 1 | Chapter 2 | Chapter 3 | Chapter 4 | Chapter 5 | Chapter 6 | Chapter 7

Practice more: Chapter 1 | Chapter 2 | Chapter 3 | Chapter 4 | Chapter 5 | Chapter 6

Quick revision: Chapter 1 | Chapter 2 | Chapter 3 | Chapter 4 | Chapter 5 | Chapter 6