

APOLLO

Integration-II (Techniques of Integration) FBISE Mathematics Class 12 (HSSC-II)

Domain A: Numbers and Algebra

28 questions | questions

Original FBISE question crops. National Curriculum 2022-23 topic.

xii.	Evaluate: $\int \frac{dx}{x^2\sqrt{4-x^2}}$.	4
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OR	Evaluate: $\int \frac{x^2+x-2}{3x^3-x^2+3x-1} dx$	8
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OR	Evaluate $\int x^2 \cos x dx$ using integration by parts method	04
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(x)	Evaluate $\int \frac{e^x dx}{e^{2x} + 1}$ by substitution method	
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Q.6	Evaluate: $\int \frac{dx}{4x^3 - x}$	08
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OR	Evaluate $\int x^2 \sin x dx$ using integration by parts method.	04
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(x)	Evaluate $\int \frac{e^\theta}{e^{2\theta} + 1} d\theta$ by substitution method.	04	OR	If $\frac{x^2}{16} - \frac{y^2}{9}$: equation of a
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Q.5	Evaluate: $\int \frac{2x+1}{x^3+3x^2+2x} dx$	08
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OR	Evaluate $\int \frac{dx}{x^2\sqrt{x^2-9}}$	04
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Solve the homogeneous differential equation $\frac{dy}{dx} = \frac{x+y}{x-y}$	08	OR	Evaluate $\int \frac{6x^2+5x+4}{x(x+1)(x-1)(x+2)} dx$	08
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First Annual 2026 | Section B Q2(iii) | 4 marks

(iii)	Evaluate $\int \sin^2 x \, dx$	04
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First Annual 2026 | Section B Q2(ix) OR | 4 marks

Evaluate $\int_0^1 x e^x \, dx$ using integration by parts.	04
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First Annual 2026 | Section C Q5 OR | 8 marks

Q.5	For the triangle with vertices $A(0,0)$, $B(4,0)$, $C(0,6)$, verify that the three medians are concurrent. Find the point of concurrency (centroid).	08	OR	(a) Resolve into partial fractions:	08
				$\frac{x^2 + 3x + 4}{(x^2 + 2x + 5)(x - 1)}$ (b) Hence find: $\int \frac{x^2 + 3x + 4}{(x^2 + 2x + 5)(x - 1)} \, dx$	

First Annual 2026 | Section B Q2(iii) | 4 marks

(iii)	Evaluate the integral: $\int \cos^2(2\theta) \, d\theta$	04
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First Annual 2026 | Section B Q2(ix) OR | 4 marks

Use the method of integration by parts to evaluate:	04
$\int_1^2 x(\ln x) \, dx$	

First Annual 2026 | Section C Q5 OR | 8 marks

(a) Resolve into partial fractions:	08
$\frac{3x^2 + 2x + 7}{(x^2 + 4x + 5)(x - 3)}$	
(b) Hence find: $\int \frac{3x^2 + 2x + 7}{(x^2 + 4x + 5)(x - 3)} \, dx$	

First Annual 2025 | Section B Q2(ix) OR | 4 marks

Evaluate $\int \sqrt{1 - \cos 2x} \, dx$	04
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First Annual 2025 | Section B Q2(vi) | 4 marks

(vi)	Evaluate $\int_0^1 \frac{3x}{\sqrt{4 - 3x}} \, dx$	04
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First Annual 2025 | Section C Q5 OR | 8 marks

OR	Evaluate $\int \sqrt{1 + \sin x} \, dx$ where $\left(-\frac{\pi}{2} < x < \frac{\pi}{2}\right)$	08
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OR	Evaluate	(a) $\int a^{x^2} x \, dx \, (a > 0, a \neq 1)$	04
		(b) $\int (a - 2x)^{\frac{2}{3}} dx$	

OR	Evaluate $\int \frac{x \sin^{-1} x}{\sqrt{1-x^2}} dx$ by parts.	08
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5x + 4y + 3 = 0 is.				
To evaluate $\int 2xe^{x^2} dx$, the appropriate substitution is:	$u = x^2$	$u = e^{x^2}$	$u = 2x$	$u = x$

increasing or decreasing at $x = 1$.
Evaluate the integral using substitution $x = 5 \tan \theta$:
$\int \frac{1}{\sqrt{x^2 + 25}} dx$

Evaluate using the method of partial fractions and express your answer as a single logarithm:
$\int \frac{6x^2 + 11x + 3}{(x+1)(x+2)(x+3)} dx$
Find the coordinates of the centre of the circumcircle

08	OR	Using partial fraction, evaluate
		$\int \frac{6x^2 + 5x + 4}{x(x+1)(x-1)(x+2)} dx$

ix.	Evaluate $\int \frac{dx}{x^2 - 1}$	4
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Evaluate $\int x e^{-x} dx$	4
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Q5	Evaluate $\int (\theta^4 + \pi) e^{3\theta} d\theta$	8
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