



Higher Mathematics

Integration - Questions

Marks are indicated in brackets after each question number

2013 Paper 1 Question 7, (2)

Find $\int x(3x + 2) dx$.

2013 Paper 1 Question 16, (2)

Find $\int (1-6x)^{-\frac{1}{2}} dx$ where $x < \frac{1}{6}$.

2013 Paper 2 Question 6, (5)

Given that $\int_0^a 5 \sin 3x dx = \frac{10}{3}$, $0 \leq a < \pi$,

calculate the value of a .

2014 Paper 1 Question 5, (2)

Find $\int (2x + 9)^5 dx$.

2014 Paper 2 Question 5, (5)

Given that $\int_4^t (3x + 4)^{-\frac{1}{2}} dx = 2$, find the value of t .

2015 Paper 2 Question 7, (2) (2) (2)

(a) Find $\int (3 \cos 2x + 1) dx$.

(b) Show that $3 \cos 2x + 1 = 4 \cos^2 x - 2 \sin^2 x$.

(c) Hence, or otherwise, find $\int (\sin^2 x - 2 \cos^2 x) dx$.



2016 Paper 1 Question 5, (2)

Find $\int 8\cos(4x+1)dx$.

2016 Paper 2 Question 9, (4)

For a function f , defined on a suitable domain, it is known that:

- $f'(x) = \frac{2x+1}{\sqrt{x}}$
- $f(9) = 40$

Express $f(x)$ in terms of x .

2017 Paper 1 Question 13, (4)

Find $\int \frac{1}{(5-4x)^{\frac{1}{2}}} dx$, $x < \frac{5}{4}$.

2022 Paper 1 Question 6, (4)

Evaluate $\int_{-5}^2 (10-3x)^{-\frac{1}{2}} dx$.

2022 Paper 2 Question 6, (5)

A curve with equation $y = f(x)$ is such that $\frac{dy}{dx} = 1 - \frac{3}{x^2}$, where $x > 0$.

The curve passes through the point $(3, 6)$.

Express y in terms of x .

2023 Paper 1 Question 6, (4)

Find $\int (2x^5 - 6\sqrt{x}) dx$, $x \geq 0$.



2023 Paper 1 Question 11, (3) (1)

(a) Evaluate $\int_{\frac{\pi}{2}}^{\pi} (5 \sin x - 3 \cos x) dx$.

The diagram in your answer booklet shows the graphs with equations $y = 5 \sin x$ and $y = 3 \cos x$, $0 \leq x \leq 2\pi$.

(b) On the diagram in your answer booklet, shade the area represented by the integral in (a).

2023 Paper 2 Question 3, (2)

Find $\int 7 \cos\left(4x + \frac{\pi}{3}\right) dx$.

2023 Paper 2 Question 12, (4)

A curve, for which $\frac{dy}{dx} = 8x^3 + 3$, passes through the point $(-1, 3)$.

Express y in terms of x .

2024 Paper 2 Question 5, (3)

Evaluate $\int_0^{\frac{\pi}{7}} \sin 5x dx$.

2025 Paper 1 Question 3, (4)

Find $\int \left(\frac{12}{x^2} + x^{\frac{1}{2}} \right) dx$, $x > 0$.



2025 Paper 1 Question 12, (4)

Given that:

- $\frac{dy}{dx} = 6 \cos x + 8 \sin 2x$, and
- $y = 4$ when $x = \frac{\pi}{6}$,

express y in terms of x .

2025 Paper 2 Question 7, (2)

Find $\int (3x+2)^7 dx$.

2026 Paper 1 Question 2, (4)

Find $\int \left(15x^{\frac{2}{3}} + \frac{7}{x^2} \right) dx, x > 0$.

2026 Paper 1 Question 10, (4)

Find $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} 6 \sin \left(3x - \frac{\pi}{2} \right) dx$.