

# Questions: Introduction to integration

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## Summary

A selection of questions for the study guide on introduction to integration.

*Before attempting these questions, it is highly recommended that you read [Guide: Introduction to integration](#).*

## Q1

Using the power rule and laws of indices (as appropriate), find the following indefinite integrals.

1.1.  $\int x^4 \, dx$

1.2.  $\int 2x \, dx$

1.3.  $\int 7x^5 \, dx$

1.4.  $\int -5 \, dt$

1.5.  $\int \frac{3}{y^3} \, dy$

1.6.  $\int 6x^{-4} \, dx$

1.7.  $\int -\frac{2}{x^5} \, dx$

1.8.  $\int \frac{8}{3x^6} \, dx$

1.9.  $\int -\frac{7}{2z^7} \, dz$

1.10.  $\int x^{1/3} \, dx$

1.11.  $\int 3t^{-2/3} \, dt$

1.12.  $\int \frac{4x^{1/4}}{3} \, dx$

$$1.13. \quad \int \frac{2}{5x^{1/3}} \, dx$$

$$1.14. \quad \int \frac{5}{6y^{-4/3}} \, dy$$

## Q2

Find the following integrals.

$$2.1. \quad \int e^{2x} \, dx$$

$$2.2. \quad \int -3e^{-3x} \, dx$$

$$2.3. \quad \int 2e^{11x} \, dx$$

$$2.4. \quad \int \frac{4}{x} \, dx$$

$$2.5. \quad \int -\frac{5}{3x} \, dx$$

$$2.6. \quad \int \cos(x) \, dx$$

$$2.7. \quad \int \sin(2x) \, dx$$

$$2.8. \quad \int \frac{5}{6} \cos(x) \, dx$$

$$2.9. \quad \int \cos(3x) \, dx$$

$$2.10. \quad \int \sin\left(\frac{x}{3}\right) \, dx$$

## Q3

Evaluate the following definite integrals with respect to  $x$ .

$$3.1. \quad \int_1^4 2 \, dx$$

$$3.2. \quad \int_{-2}^2 3x \, dx$$

$$3.3. \quad \int_2^4 2x^3 \, dx$$

$$3.4. \quad \int_1^{27} \frac{4}{\sqrt[3]{x}} \, dx$$

$$3.5. \int_0^{\ln(3)} 4e^x \, dx$$

$$3.6. \int_0^5 e^{-3x} \, dx$$

$$3.7. \int_1^2 -4e^{4x} \, dx$$

$$3.8. \int_1^2 \frac{2}{x} \, dx$$

$$3.9. \int_1^{e^3} -\frac{4}{x} \, dx$$

$$3.10. \int_{e^3}^{e^9} \frac{9}{5x} \, dx$$

$$3.11. \int_0^{\pi/2} \sin(x) \, dx$$

$$3.12. \int_0^{\pi} \cos(x) \, dx$$

$$3.13. \int_0^{\pi/4} \sin(2x) \, dx$$

$$3.14. \int_0^{\pi/6} \cos(2x) \, dx$$

$$3.15. \int_{-\pi/4}^0 \sin(3x) \, dx$$

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After attempting the questions above, please click [this link](#) to find the answers.

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## Version history and licensing

v1.0: initial version created 05/25 by Donald Campbell as part of a University of St Andrews VIP project.

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