

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

1.5. $\int -5 \, dt$

Q2

Use the power rule to integrate the following expressions, applying the laws of indices where necessary.

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

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

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

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

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

Q3

The following expressions contain fractional indices of x . Find these integrals.

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

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

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

3.4. $\int \frac{2}{5x^{1/3}} dx$

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

Q5

Integrate the following functions with respect to x .

5. $\int e^{2x} dx$

6. $\int -3e^{-3x} dx$

7. $\int 2e^{11x} dx$

8. $\int \frac{4}{x} dx$

9. $\int -\frac{5}{3x} dx$

5.1. $\int \cos(x) dx$

5.2. $\int \sin(2x) dx$

5.3. $\int \frac{5}{6} \cos(x) dx$

5.4. $\int \cos(3x) dx$

5.5. $\int \sin\left(\frac{x}{3}\right) dx$

Q1

Evaluate the following definite integrals with respect to x .

1.1. $\int_1^4 2 \, dx$

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

1.4. $\int_2^4 2x^3 \, dx$

Q2

By using an appropriate substitution, evaluate the following definite integrals with respect to x .

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

Q3

Evaluate the following trigonometric definite integrals with respect to x , using the graphs of $\sin(ax)$ and $\cos(bx)$ to help you.

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

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

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

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

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

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

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

$$3.2. \int_0^{\pi} \cos(x) \, dx$$

$$3.6. \int_0^{\pi/4} \sin(2x) \, dx$$

Q4

Evaluate the following trigonometric definite integrals with respect to x , using the graphs of $\sin(ax)$ and $\cos(bx)$ to help you.

$$4.1. \int_0^{\pi/6} \cos(2x) \, dx$$

$$4.2. \int_{-\pi/4}^0 \sin(3x) \, dx$$

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

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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