

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

Use the power rule to integrate the following expressions with respect to x .

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

1.2. $\int 2x \, dx$

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

1.4. $\int 3x \, dx$

1.5. $\int -5 \, dx$

1.6. $\int (2x - 5x^2) \, dx$

1.7. $\int (4x^2 + 2) \, dx$

1.8. $\int (10x^{-2} - 2x) \, dx$

1.9. $\int (3x^8 + 4x^{-4} - 2x) \, dx$

1.10. $\int (5x - 2x^{-3} - 3x^4) \, dx$

Q2

Use the power rule to integrate the following expressions with respect to x , using the laws of indices where necessary.

- 2.1. $\int \frac{3}{x^3} dx$
- 2.2. $\int \frac{6}{x^4} dx$
- 2.3. $\int -\frac{2}{x^5} dx$
- 2.4. $\int \frac{8}{3x^6} dx$
- 2.5. $\int -\frac{7}{2x^7} dx$
- 2.6. $\int \left(\frac{5}{x^4} + \frac{3}{x^5} \right) dx$
- 2.7. $\int \left(\frac{4}{3x^3} - \frac{6}{5x^7} \right) dx$
- 2.8. $\int \left(\frac{7}{x^4} + x^3 - \frac{2}{x^6} \right) dx$
- 2.9. $\int \left(\frac{3}{x^5} + \frac{4}{x^6} - 1 \right) dx$
- 2.10. $\int \left(\frac{9}{x^9} + \frac{4}{7x^6} - \frac{7}{3x^8} \right) dx$

Q3

The following expressions contain fractional indices of x . Use the power rule to integrate these expressions with respect to x , using the laws of indices where necessary.

- 3.1. $\int x^{1/3} dx$
- 3.2. $\int 3x^{-2/3} dx$
- 3.3. $\int \frac{4x^{1/4}}{3} dx$
- 3.4. $\int \frac{2}{5x^{1/3}} dx$
- 3.5. $\int \frac{5}{6x^{-4/3}} dx$
- 3.6. $\int 2\sqrt[3]{x} dx$
- 3.7. $\int \frac{6}{\sqrt[4]{x}} dx$
- 3.8. $\int \left(x^3 - \frac{3}{4\sqrt[3]{x}} + \sqrt[4]{x} \right) dx$

$$3.9. \int \left(\sqrt[5]{x} - \frac{4}{\sqrt[3]{x}} \right) dx$$

$$3.10. \int \sqrt[4]{x^5} dx$$

$$3.11. \int x(2 - \sqrt[3]{x}) dx$$

$$3.12. \int \frac{x}{3} (\sqrt{x^4} - 2x^{1/3}) dx$$

$$3.13. \int \frac{5}{\sqrt[3]{x}} (3x^2 + 2)^2 dx$$

$$3.14. \int (3x^2 + 4x)(x^3 + 1)^2 dx$$

$$3.15. \int \frac{2}{\sqrt[4]{x}} (2x^2 + 3)^2 dx$$

Q4

Integrate the following expressions with respect to x by simplifying the fractions first.

$$4.1. \int \frac{x^3 - 2x}{x} dx$$

$$4.2. \int \frac{x^4 - 3x}{x^3} dx$$

$$4.3. \int \frac{x^2 - 1}{\sqrt{x}} dx$$

$$4.4. \int \frac{x^3 + 5x}{\sqrt[3]{x}} dx$$

$$4.5. \int \frac{(x^2 - 1)(2x^3 - 3)}{x^2} dx$$

$$4.6. \int \frac{4(3x - 1)^2}{x^5} dx$$

$$4.7. \int \frac{5 - 8x^2}{x\sqrt{x}} dx$$

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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