

# Answers: Introduction to integration

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## Summary

Answers to questions relating to the guide on introduction to integration.

*These are the answers to [Questions: Introduction to integration](#).*

**Please attempt the questions before reading these answers!**

## Answers

To integrate the expressions, use the power rule for integration

$$\int x^n dx = \frac{x^{n+1}}{n+1} + C$$

### Q1

1.1.  $\frac{1}{5}x^5 + C$

1.2.  $x^2 + C$

1.3.  $\frac{7}{6}x^6 + C$

1.4.  $\frac{3}{2}x^2 + C$

1.5.  $-5x + C$

1.6.  $x^2 - \frac{5}{3}x^3 + C$

1.7.  $\frac{4}{3}x^3 + 2x + C$

1.8.  $-10x^{-1} - x^2 + C$

1.9.  $\frac{1}{3}x^9 - \frac{4}{3}x^{-3} - x^2 + C$

1.10.  $\frac{5}{2}x^2 + x^{-2} - \frac{3}{5}x^5 + C$

### Q2

2.1.  $-\frac{3}{2}x^{-2} + C$

- 2.2.  $-2x^{-3} + C$
- 2.3.  $\frac{1}{2}x^{-4} + C$
- 2.4.  $-\frac{8}{15}x^{-5} + C$
- 2.5.  $\frac{7}{12}x^{-6} + C$
- 2.6.  $-\frac{5}{3}x^{-3} - \frac{3}{4}x^{-4} + C$
- 2.7.  $-\frac{2}{3}x^{-2} + \frac{1}{5}x^{-6} + C$
- 2.8.  $-\frac{7}{3}x^{-3} + \frac{1}{4}x^4 + \frac{2}{5}x^{-5} + C$
- 2.9.  $-\frac{3}{4}x^{-4} - \frac{4}{5}x^{-5} - x + C$
- 2.10.  $-\frac{9}{8}x^{-8} - \frac{4}{35}x^{-5} + \frac{1}{3}x^{-7} + C$

### Q3

- 3.1.  $\frac{3}{4}x^{4/3} + C$
- 3.2.  $9x^{1/3} + C$
- 3.3.  $\frac{16}{15}x^{5/4} + C$
- 3.4.  $\frac{3}{5}x^{2/3} + C$
- 3.5.  $\frac{5}{14}x^{7/3} + C$
- 3.6.  $\frac{3}{2}x^{4/3} + C$
- 3.7.  $8x^{3/4} + C$
- 3.8.  $\frac{1}{4}x^4 + \frac{9}{8}x^{2/3} + \frac{4}{5}x^{5/4} + C$
- 3.9.  $\frac{5}{6}x^{6/5} - 6x^{2/3} + C$
- 3.10.  $\frac{4}{9}x^{9/4} + C$
- 3.11.  $x^2 - \frac{3}{7}x^{7/3} + C$
- 3.12.  $\frac{1}{12}x^4 - \frac{2}{7}x^{7/3} + C$
- 3.13.  $\frac{135}{14}x^{14/3} + \frac{45}{2}x^{8/3} + 30x^{2/3} + C$

$$3.14. \quad \frac{1}{3}x^9 + \frac{1}{2}x^8 + x^6 + \frac{8}{5}x^5 + x^3 + 2x^2 + C$$

$$3.15. \quad \frac{32}{19}x^{19/4} + \frac{96}{11}x^{11/4} + 24x^{3/4} + C$$

#### Q4

$$4.1. \quad \frac{1}{3}x^3 - 2x + C$$

$$4.2. \quad \frac{1}{2}x^2 + 3x^{-1} + C$$

$$4.3. \quad \frac{2}{5}x^{5/2} - 2x^{1/2} + C$$

$$4.4. \quad \frac{3}{11}x^{11/3} + 3x^{5/3} + C$$

$$4.5. \quad \frac{1}{2}x^4 - x^2 - 3x - 3x^{-1} + C$$

$$4.6. \quad -18x^{-2} + 8x^{-3} - x^{-4} + C$$

$$4.7. \quad -\frac{16}{3}x^{3/2} - 10x^{-1/2} + C$$

## 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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