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

$$\int x^n \, \mathrm{d}x = \frac{x^{n+1}}{n+1} + C$$

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

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

Q4

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

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

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

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

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

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

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

Version history and licensing

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