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. $\int x^4 \, \mathrm{d}x$

1.2. $\int 2x \, \mathrm{d}x$

1.3. $\int 7x^5 \, \mathrm{d}x$

1.5. $\int -5 \, \mathrm{d}t$

Q2

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

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

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

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

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

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

Q3

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

3.1. $\int x^{1/3}\,\mathrm{d}x$

3.2. $\int 3t^{-2/3}\,\mathrm{d}t$

3.3. $\int \frac{4x^{1/4}}{3}\,\mathrm{d}x$

3.4. $\int \frac{2}{5x^{1/3}}\,\mathrm{d}x$

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

Q5

Integrate the following functions with respect to x.

5. $\int e^{2x}\,\mathrm{d}x$

6. $\int -3e^{-3x}\,\mathrm{d}x$

7. $\int 2e^{11x}\,\mathrm{d}x$

8. $\int \frac{4}{x}\,\mathrm{d}x$

9. $\int -\frac{5}{3x}\,\mathrm{d}x$

5.1. $\int \cos(x)\,\mathrm{d}x$

5.2. $\int \sin(2x)\,\mathrm{d}x$

5.3. $\int \frac{5}{6}\cos(x)\,\mathrm{d}x$

5.4. $\int \cos(3x)\,\mathrm{d}x$

5.5. $\int \sin\left(\frac{x}{3}\right)\,\mathrm{d}x$

Q1

Evaluate the following definite integrals with respect to x.

1.1. $\int_1^4 2\,\mathrm{d}x$

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

1.4. $\int_2^4 2x^3\,\mathrm{d}x$

Q2

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

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

Q3

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

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

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

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

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

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

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

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

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

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

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

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

After attempting the questions above, please click this link to find the answers.

Version history and licensing

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