

Integration (powers of x) 4ii

A Level

P

P

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Part A

Cubic

Find $\int (x^3 + 8x - 5) \, dx$.

The following symbols may be useful: C , c , k , x

Part B

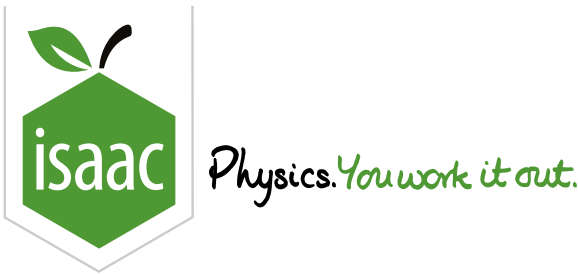
Square root

Find $\int 12\sqrt{x} \, dx$.

The following symbols may be useful: C , c , k , x

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Indefinite Integrals 1

Pre-Uni Maths for Sciences K1.1

A Level

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Find the following indefinite integrals.

Part A Integrate $(3x - 1)(x + 1)$

Find $\int (3x - 1)(x + 1) \, dx$.

The following symbols may be useful: C , c , k , x

Part B Integrate $(\sqrt{p} - \frac{1}{p})^2$

Find $\int (\sqrt{p} - \frac{1}{p})^2 \, dp$.

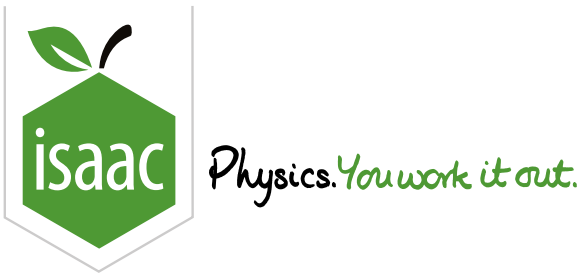
The following symbols may be useful: C , c , k , p

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Indefinite Integrals 2

Pre-Uni Maths for Sciences K1.2

A Level

P

P

P

Find the following indefinite integrals.

Part A Integrate $\frac{q^2+3}{q^{\frac{5}{2}}}$

Find $\int \frac{q^2+3}{q^{\frac{5}{2}}} \, dq$.

The following symbols may be useful: c , c , k , q

Part B Integrate $2z(z^2-1)(z^2+1)$

Find $\int 2z(z^2-1)(z^2+1) \, dz$.

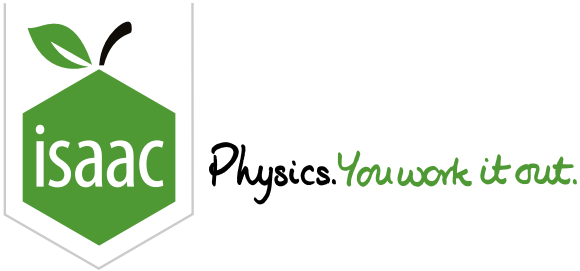
The following symbols may be useful: c , c , k , z

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Integrating Powers 1

Pre-Uni Maths for Sciences K1.8



Part A

Integrate $4x^3$

Find the indefinite integral of $4x^3$.

The following symbols may be useful: C , c , k , x

Part B

Integrate αx

Find $\int_0^{x_0} \alpha x \, dx$, where α is a constant.

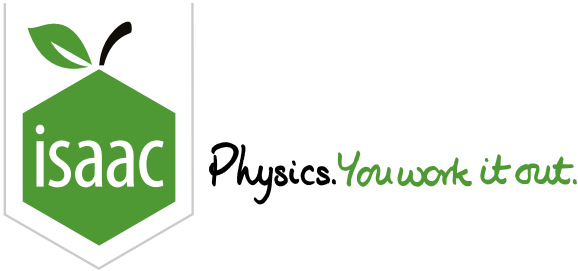
The following symbols may be useful: α , x_0

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Integrating Powers 2

Pre-Uni Maths for Sciences K1.9

A Level

P

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Part A

Integrate ax^{-8}

Find the indefinite integral of ax^{-8} , where a is a constant.

The following symbols may be useful: c , a , c , k , x

Part B

Integrate $\frac{4}{x^2}$

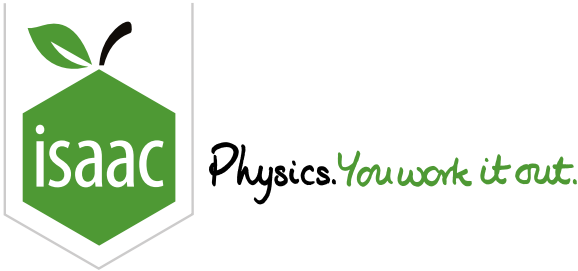
Find $\int_1^2 \frac{4}{x^2} dx$.

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Integration (powers of x) 1ii

A Level

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Part A

Find integral

Find $\int (2x + 1)(x + 3)dx$

The following symbols may be useful: C , c , k , x

Part B

Evaluate integral

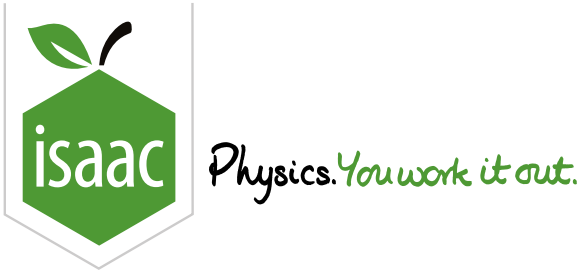
Evaluate $\int_0^9 \frac{1}{\sqrt{x}}dx$.

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Definite Integrals 3

Pre-Uni Maths for Sciences K1.5

A Level

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For the integrals given below, find the values of a and m respectively.

Part A $\int_{-1}^a x^{-\frac{4}{5}} \, dx = 10$

Given that the definite integral $\int_{-1}^a x^{-\frac{4}{5}} \, dx = 10$, find the value of a .

The following symbols may be useful: a

Part B $\int_0^4 \frac{m+1}{2} x^m \, dx = 4$

Given that the integral $\int_0^4 \frac{m+1}{2} x^m \, dx = 4$, find the value of m .

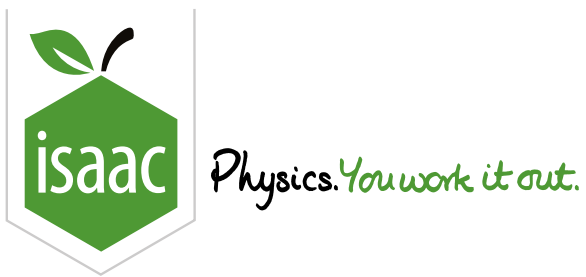
The following symbols may be useful: m

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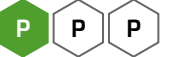


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Definite Integrals 2

Pre-Uni Maths for Sciences K1.4

A Level



Find the following definite integrals.

Part A $\int_1^{36} \frac{9}{5x\sqrt{x}} dx$

Find $\int_1^{36} \frac{9}{5x\sqrt{x}} dx$.

Part B $\int_{-8}^0 \frac{1}{\sqrt[3]{x}} dx$

Find $\int_{-8}^0 \frac{1}{\sqrt[3]{x}} dx$.

Part C $\int_{-1}^1 \left(1 + x + \frac{x^2}{2} + \frac{x^3}{6}\right) dx$

Find $\int_{-1}^1 \left(1 + x + \frac{x^2}{2} + \frac{x^3}{6}\right) dx$. Give your answer as an improper fraction.

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Integrating Powers 4

Pre-Uni Maths for Sciences K2.10

A Level Further A



Part A Integrate $\frac{A}{r^7} - \frac{B}{r^{13}}$

Find $\int_a^\infty \left(\frac{A}{r^7} - \frac{B}{r^{13}} \right) dr$.

(The force between, for example, two atoms of an inert gas, a distance r apart is given by $\left(\frac{A}{r^7} - \frac{B}{r^{13}} \right)$, where A and B are (negative) constants; the first term is the attractive force between them (the van der Waals interaction, due to their fluctuating induced dipoles) and the second is the repulsive force due to the overlap of their electron shells. The integral describes the potential energy of such a system i.e. the work done bringing one atom from infinity to within a distance a of the other atom.)

The following symbols may be useful: A , B , a

Part B Integrate $\frac{C}{x^2} + D$

Find $\int_{x_1}^{x_2} \left(\frac{C}{x^2} + D \right) dx$.

(The function $\left(\frac{C}{x^2} + D \right)$, where C and D are constants, could describe the component of an electric field in the x -direction due to a combination of the field due to a point charge at the origin and a uniform field in the x -direction. The integral is then the potential difference between two points x_1 and x_2 on the x -axis.)

The following symbols may be useful: C , D , x_1 , x_2

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