

<u>Gameboard</u>

Maths

Calculus Integration Integration by Substitution 1

Integration by Substitution 1



Integrate $\sin(c\theta)$ Part A

Find $\int \sin(c\theta) d\theta$, where c is a constant.

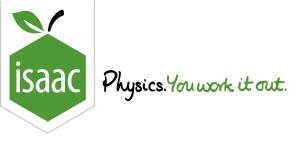
The following symbols may be useful: c, k, theta

Integrate $e^{lpha v}$ Part B

Find $\int \mathrm{e}^{\alpha v} \mathrm{d}v$, where α is a constant.

The following symbols may be useful: alpha, e, k, v

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Maths

Calculus Integration

Integration by Substitution 2

Integration by Substitution 2



Part A Integrate $(bv+c)^2$

Find $\int (bv+c)^2 \mathrm{d}v$, where b and c are constants.

The following symbols may be useful: b, c, k, v

Part B Integrate $a(y-b)^3$

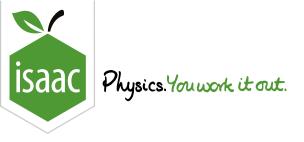
Find $\int_0^b a(y-b)^3 \mathrm{d}y$, where a and b are constants.

The following symbols may be useful: a, b

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STEM SMART Single Maths 31 - Integration by Substitution



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Maths

Integration: General 4ii

Integration: General 4ii



Part A Integrate $(4-3x)^7$

Find
$$\int (4-3x)^7 \mathrm{d}x$$
.

The following symbols may be useful: c, \times

Part B Integrate $(4-3x)^{-1}$

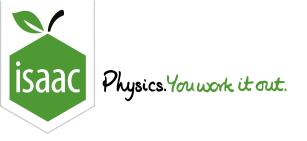
Find
$$\int (4-3x)^{-1} \mathrm{d}x$$
.

The following symbols may be useful: c, x

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Maths

Integration by Substitution 5ii

Integration by Substitution 5ii

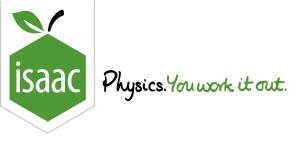


Use the substitution u=2x-5 to find the exact value of $\int_{\frac{5}{2}}^3 (4x-8)(2x-5)^7 \mathrm{d}x$.

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Home Gameboard

Maths

Integration by Substitution 5i

Integration by Substitution 5i

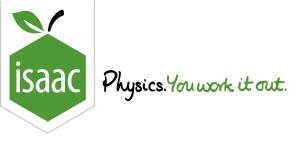


Use the substitution
$$u=2x+1$$
 to evaluate $\int_0^{rac{1}{2}} rac{4x-1}{(2x+1)^5} \mathrm{d}x.$

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Maths

Integration by Substitution 4ii

Integration by Substitution 4ii

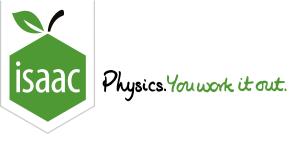


Use the substitution
$$u=\sqrt{x+2}$$
 to find the exact value of $\int_{-1}^7 \frac{x^2}{\sqrt{x+2}} \mathrm{d}x$.

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Maths

Integration by Substitution 4i

Integration by Substitution 4i

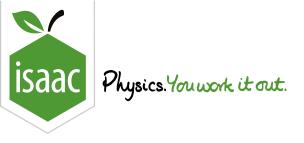


Use the substitution $u=1+\sqrt{x}$ to find the exact value of $\int_4^9 \frac{1}{1+\sqrt{x}} \mathrm{d}x$ in the form $a+b\ln(c)$, where a,b, and c are positive constants to be found.

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Maths

Calculus Integration

Integration by Substitution 3

Integration by Substitution 3



Part A Integrate $\frac{3}{(z+1)^2}$

Find
$$\int_0^2 \frac{3}{(z+1)^2} \mathrm{d}z$$
.

Part B Integrate $rac{e^{-\alpha x}}{(1+e^{-\alpha x})^4}$

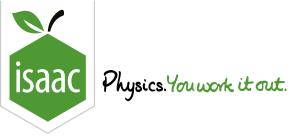
Find $\int rac{\mathrm{e}^{-lpha x}}{(1+\mathrm{e}^{-lpha x})^4} \mathrm{d}x$, where lpha is a constant.

The following symbols may be useful: alpha, e, k, x

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Maths

Integration by Substitution 2i

Integration by Substitution 2i



In this question, I denotes the definite integral $\int_2^5 \frac{5-x}{2+\sqrt{x-1}} \mathrm{d}x$. The value of I can be found using two different methods.

Part A Substitution

Show that the substitution $u=\sqrt{x-1}$ transforms I to $\int_1^2{(4u-2u^2)\mathrm{d}u}$ and hence find the exact value of I.

The following symbols may be useful: I

Part B Rationalisation

Simplify as far as possible $\Big(2+\sqrt{x-1}\Big)\Big(2-\sqrt{x-1}\Big)$.

The following symbols may be useful: x

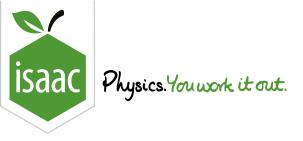
By first multiplying the numerator and denominator of $\frac{5-x}{2+\sqrt{x-1}}$ by $2-\sqrt{x-1}$, find the exact value of I.

The following symbols may be useful: I

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Maths

Integration: General 5i

Integration: General 5i



Part A Integrate $\frac{18}{\sqrt{6x+1}}$

Find $\int_0^4 \frac{18}{\sqrt{6x+1}} \, \mathrm{d}x$ correct to two significant figures.

Part B Integrate $(\mathrm{e}^x+2)^2$

Find $\int_0^1 \left(\mathrm{e}^x+2\right)^2\!\mathrm{d}x$, giving your answer in terms of e .

The following symbols may be useful: e

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