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Maths

Partial Fractions 3ii

Partial Fractions 3ii



The equation of a curve is y=f(x), where $f(x)=\dfrac{3x+1}{(x+2)(x-3)}$.

Part A Partial Fractions

Hence express f(x) in partial fractions.

The following symbols may be useful: x

Part B Derivative

Hence find f'(x).

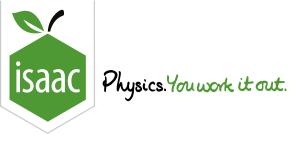
The following symbols may be useful: Derivative(y, x), ln(), log(), x, y

Part C Deduction

Hence deduce that the gradient of the curve is negative for all points on the curve.

More practice questions?

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Maths

Partial Fractions 2ii

Partial Fractions 2ii



Partial Fractions Part A

Express
$$\frac{x-1}{x(x+1)}$$
 in partial fractions.

The following symbols may be useful: x

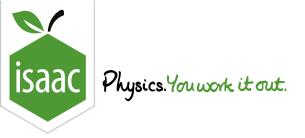
Integral Part B

Hence find the exact value of
$$\int_1^2 \frac{x-1}{x(x+1)} \mathrm{d}x$$
.

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Maths

Partial Fractions 1i

Partial Fractions 1i



Part A Partial Fractions

Express
$$\frac{2+x^2}{(1+2x)(1-x)^2}$$
 in the form $\frac{A}{1+2x}+\frac{B}{1-x}+\frac{C}{(1-x)^2}$.

The following symbols may be useful: x

Part B Integration

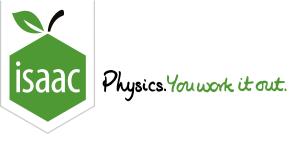
Hence find
$$\int_0^{rac{1}{4}} rac{2+x^2}{(1+2x)(1-x)^2} \mathrm{d}x$$
 in exact form.

The following symbols may be useful: , ln(), log()

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Maths

Partial Fractions 4ii

Partial Fractions 4ii



Part A Partial Fractions

Express $\frac{7-2x}{(x-2)^2}$ in the form $\frac{A}{x-2}+\frac{B}{(x-2)^2}$, where A, and B are constants.

The following symbols may be useful: x

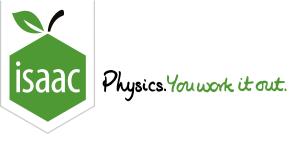
Part B Integral

Hence find the exact value of $\int_4^5 \frac{7-2x}{(x-2)^2} \mathrm{d}x$.

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Calculus

Integration

Integration by Substitution 4

Integration by Substitution 4



Part A Integrate $\frac{1}{b(x+a)}$

Find
$$\int_0^a rac{1}{b(x+a)} \mathrm{d}x$$
, where a and b are constants.

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

Part B Integrate $\frac{x}{1+x^2}$

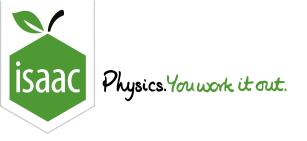
Find
$$\int_0^1 \frac{x}{1+x^2} \mathrm{d}x$$
.

The following symbols may be useful: k, x

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Maths

Calculus Integration Integration by Substitution 5

Integration by Substitution 5



Integrate $x^3/(a^5+ax^4)$ Part A

Find
$$\int_a^{2a} rac{x^3}{a^5 + ax^4} \mathrm{d}x$$
.

The following symbols may be useful: a

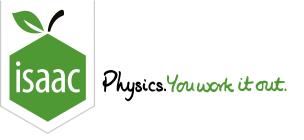
Integrate anetaPart B

By writing
$$aneta=rac{\sineta}{\coseta}$$
 , find $\int_0^{\pi/4} aneta\mathrm{d}eta$.

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Maths

Integration by Substitution 1i

Integration by Substitution 1i



Let
$$I=\int rac{1}{xig(1+\sqrt{x}ig)^2}\mathrm{d}x.$$

Part A Substitution

Using the substitution $u=\sqrt{x}$, transform I into the integral $\int f(u)\mathrm{d}u$. Give the function f(u) in terms of u.

The following symbols may be useful: f, u

Part B Partial Fractions

Express $\frac{2}{u(1+u)^2}$ in the form $\frac{A}{u} + \frac{B}{1+u} + \frac{C}{(1+u)^2}$.

The following symbols may be useful: u

Part C Integrate

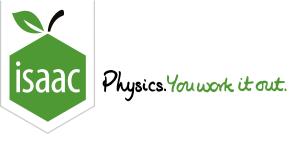
Hence find I.

The following symbols may be useful: I, c, x

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Maths

Integration by Substitution 1ii

Integration by Substitution 1ii



Part A Partial Fractions

Given that $\frac{2t}{(t+1)^2}$ can be expressed in the form $\frac{A}{t+1} + \frac{B}{(t+1)^2}$, find the values of the constants A and B.

State the value of A.

The following symbols may be useful: A

State the value of B.

The following symbols may be useful: B

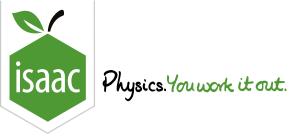
Part B Show

Show that the substitution $t=\sqrt{2x-1}$ transforms $\int rac{1}{x+\sqrt{2x-1}} \mathrm{d}x$ to $\int rac{2t}{(t+1)^2} \mathrm{d}t$.

More practice questions?

Part C Exact Value

Hence find the exact value of $\int_1^5 rac{1}{x+\sqrt{2x-1}} \mathrm{d}x.$



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Maths

Algebraic Division 1ii

Algebraic Division 1ii



Part A Quotient and Remainder

Find the quotient when $3x^3-x^2+10x-3$ is divided by x^2+3 .

The following symbols may be useful: x

Give the remainder.

The following symbols may be useful: \boldsymbol{x}

Part B Integral

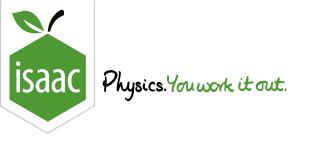
Hence find the exact value of

$$\int_0^1 rac{3x^3-x^2+10x-3}{x^2+3}\mathrm{d}x.$$

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General Functions Functions

Integration With Partial Fractions 2

Integration With Partial Fractions 2



Write the function
$$\frac{2z^2-z-3}{(z+2)(z^2-2z-1)}$$
 in the form $\frac{A}{z+2}+\frac{B+Cz}{z^2-2z-1}$. Hence find $\int_1^2 \frac{2z^2-z-3}{(z+2)(z^2-2z-1)} \, \mathrm{d}z$.

Find A Part A

Find the constant A

Part B Find B

Find the constant B.

Find C Part C

Find the constant C.

Integrate Part D

Hence find
$$\displaystyle \int_1^2 rac{2z^2-z-3}{(z+2)(z^2-2z-1)} \; \mathrm{d}z.$$

The following symbols may be useful: cos(), cosec(), cosech(), cosh(), coth(), coth(), log(), sec(), sech(), sin(), sinh(), tan(), tanh(), z