Partial Fractions 2ii

A Level

P P P

Part A Partial Fractions

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

The following symbols may be useful: x

Part B Integral

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

Partial Fractions 1i

A Level

P P P

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

The following symbols may be useful: , _logs

Used with permission from UCLES A-level Maths papers, 2003-2017.

Gameboard:

STEM SMART Single Maths 34 - Integrating Rational Functions

Partial Fractions 4ii

A Level

P P P

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 $\int_4^5 \frac{7-2x}{(x-2)^2}\mathrm{d}x$.

Gameboard:

STEM SMART Single Maths 34 - Integrating Rational Functions

Integration by Substitution 4

A Level

P P P

Pre-Uni Maths for Sciences K3.4

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

Find $\int_0^a \frac{1}{b(x+a)}\,\mathrm{d}x$, 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`

Created for isaacphysics.org by Julia Riley.

Gameboard:

STEM SMART Single Maths 34 - Integrating Rational Functions

Integration by Substitution 5

A Level

Pre-Uni Maths for Sciences K3.5

Part A Integrate $\frac{x^3}{a^5+ax^4}$

Find $\int_a^{2a} \frac{x^3}{a^5+ax^4}\mathrm{d}x$, where a is a constant.

The following symbols may be useful: a

Part B Integrate $\tan\beta$

By writing $\tan\beta = \frac{\sin\beta}{\cos\beta}$, find $\int_0^{\frac{\pi}{4}} \tan\beta\,\mathrm{d}\beta$.

Created for isaacphysics.org by Julia Riley.

Gameboard:

STEM SMART Single Maths 34 - Integrating Rational Functions

Algebraic Division 1ii

A Level

P P P

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: x

Part B Integral

Hence find the exact value of

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

Gameboard:

STEM SMART Single Maths 34 - Integrating Rational Functions

Integration with Partial Fractions 4

Further A

P P P

Pre-Uni Maths for Sciences K5.4

Part A Find A, B and C

Write the function $\dfrac{2z^2 - z - 3}{(z+2)(z^2 - 2z - 1)}$ in the form $\dfrac{A}{z+2} + \dfrac{B + Cz}{z^2 - 2z - 1}$.

Drag and drop the correct values in the expression below.

$$\frac{\square}{z+2} + \frac{\square + \square z}{z^2 - 2z - 1}$$

Items:

-5 -4 -3 -2 -1 0 1 2 3 4 5

Part B Integrate

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

Created for isaacphysics.org by Julia Riley