A51 (H) Algebraic Fractions
- Adding and Subtracting

OCR

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16 **(a)** Simplify.

AS

$$\frac{3y^3}{y^{-4}}$$

(a) ..... **[1]**

(b) Write as a single fraction in its simplest form.

ASI

$$\frac{3}{x-1}+\frac{4}{x+2}$$

(b) ..... **[3]**

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16 **(a)** Simplify.

AS $\dfrac{3y^3}{y^{-4}}$

$y^3 \div y^{-4}$

$3 - -4$

$+$

$3y^7$

(a) ..... **[1]**

(b) Write as a single fraction in its simplest form.

ASI $\dfrac{3}{x-1} + \dfrac{4}{x+2}$

$(x-1)(x+2)$

Common den

$\dfrac{3(x+2)}{(x-1)(x+2)} + \dfrac{4(x-1)}{(x-1)(x+2)}$

$= \dfrac{3x+6}{(x-1)(x+2)} + \dfrac{4x-4}{(x-1)(x+2)}$

$\dfrac{7x+2}{(x-1)(x+2)}$ ✓

(b) ..... **[3]**

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21 Show that $\frac{5x}{x+5}+\frac{25}{x-7}-\frac{300}{(x+5)(x-7)}$ simplifies to an integer. **[6]**

A50

A51

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21 Show that $\frac{5x}{x+5}+\frac{25}{x-7}-\frac{300}{(x+5)(x-7)}$ simplifies to an integer. **[6]**

A50

A51

$$\frac{5x(x-7)}{(x+5)(x-7)}+\frac{25(x+5)}{(x-7)(x+5)}-\frac{300}{(x+5)(x-7)}$$

$$\frac{5x^2-35x+25x+125-300}{(x+5)(x-7)}$$

$x^2-2x-35$

$(x-7)(x+5)$

$$\frac{5x^2-10x-175}{(x+5)(x-7)}=\frac{5(x^2-2x-35)}{(x+5)(x-7)}$$

$$=\frac{5(x-7)(x+5)}{(x+5)(x-7)}=5\checkmark$$

Edexcel

14 Write

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$$4 - \left[(x + 3) \div \frac{x^2 + 5x + 6}{x - 2} \right]$$

as a single fraction in its simplest form.
You must show your working.

(Total for Question 14 is 4 marks)

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15 Show that $\frac{a}{b+1} - \frac{a}{(b+1)^2}$ can be written as $\frac{ab}{(b+1)^2}$

(Total for Question 15 is 2 marks)

14 Write

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$$4 - \left[(x+3) \div \frac{x^2+5x+6}{x-2} \right]$$

as a single fraction in its simplest form.
You must show your working.

$$\left[\frac{(x+3)}{1} \times \frac{(x-2)}{(x^2+5x+6)} \right]$$

$$= \left[\frac{(x+3)(x-2)}{x^2+5x+6} \right]$$

Factorise

x^2+5x+6

$= (x+3)(x+2)$

$+3 \quad +2 \quad +6$

$$= \frac{(x+3)(x-2)}{(x+3)(x+2)} = \left[\frac{x-2}{x+2} \right]$$

$8 - -2 = 10$

$$\frac{4}{1} - \frac{x-2}{x+}$$

$$\frac{4(x+2)}{1(x+2)} - \frac{x-2}{x+2} \Rightarrow \frac{4x+8}{x+2} - \frac{x-2}{x+2} = \frac{3x+10}{x+2}$$

✓

(Total for Question 14 is 4 marks)

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15 Show that $\frac{a}{b+1} - \frac{a}{(b+1)^2}$ can be written as $\frac{ab}{(b+1)^2}$

... +/- fraction

den needs to be equal

$$\frac{a(b+1)}{(b+1)(b+1)} - \frac{a}{(b+1)(b+1)}$$

$$\frac{ab+a}{(b+1)(b+1)} - \frac{a}{(b+1)(b+1)} = \frac{ab}{(b+1)(b+1)} = \frac{ab}{(b+1)^2}$$

✓

$\frac{2}{5} + \frac{1}{5} = \frac{3}{5}$ =

(Total for Question 15 is 2 marks)

(b) Express $\frac{3}{x+1} + \frac{1}{x-2} - \frac{4}{x}$ as a single fraction in its simplest form.

A51

.....

(3)

(b) Express $\frac{3}{x+1}+\frac{1}{x-2}-\frac{4}{x}$ as a single fraction in its simplest form.

A51

$\frac{3(x-2)(x)}{(x+1)(x-2)(x)} + \frac{1(x+1)(x)}{(x-2)(x+1)(x)} - \frac{4(x+1)(x-2)}{x(x+1)(x-2)}$

$3x^2+x^2-4x^2 = 0$

$-6x+1x--4x$

$3(x-2)(x)$
$(3x-6)(x)$
$3x^2-6x$

$(x+1)(x)$
x^2+1x

$4(x+1)(x-2)$
$4(x^2-2x+1x-2)$
$4(x^2-1x-2)$
$=4x^2-4x-8$

$\frac{3x^2-6x}{(x+1)(x-2)(x)} + \frac{x^2+1x}{(x+1)(x-2)(x)} - \frac{[4x^2-4x-8]}{(x+1)(x-2)(x)}$

$\frac{-1x+8}{(x+1)(x-2)(x)}$ ✓

(3)

AQA

30 $f(x) = \frac{x}{3} + 4$ for all values of x.

A51 $g(x) = 6x^2 + 3$ for all values of x.

A67

Work out $fg(x)$.

Give your answer in the form $ax^2 + b$ where a and b are integers.

[2 marks]

Answer _____

30 $f(x) = \frac{x}{3} + 4$ for all values of x.

A51 $g(x) = 6x^2 + 3$ for all values of x.

A67

Work out $fg(x)$.

Give your answer in the form $ax^2 + b$ where a and b are integers.

[2 marks]

$\frac{6x^2+3}{3} + 4$ → $2x^2 + 1 + 4$

$\frac{3(2x^2+1)}{3} + 4$

Answer $2x^2 + 5$ ✓

18 Show that, for $x \neq 0$

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A51

$$\frac{x+4}{3x} - \frac{5}{2x}$$

can be written in the form $\frac{ax+b}{cx}$ where a, b and c are integers.

[3 marks]

Answer _____

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18 Show that, for $x \neq 0$

A51

$$\frac{x+4}{3x} - \frac{5}{2x}$$

can be written in the form $\frac{ax+b}{cx}$ where a, b and c are integers.

[3 marks]

$\frac{2(x+4)}{6x} - \frac{15}{6x} = \frac{2x+8}{6x} - \frac{15}{6x}$

$\frac{2x+8-15}{6x}$

$\frac{2x-7}{6x}$

Answer $\frac{2x-7}{6x}$