

Lesson 2

GCSE Mathematics Algebraic Fractions

2.1 Common Denominator

To add or subtract two fractions, they must first be numerically adjusted to have a common denominator.

With this in mind;

Simplify the following expression;

$$\frac{5(x+3)}{7} + \frac{2(x+1)}{3}$$

[3 marks]

Note

The working is easier if care is taken to get the LCM of the denominators given. In the example, above, $\text{LCM} \{ 3, 7 \} = 21$ so both denominators were adjusted to be 21. As 3 and 7 are co-prime (no factors in common) the LCM was just 3×7 . BUT ... The given denominators will not always be co-prime !

State the values of (i) $\text{LCM} \{ 5, 6 \}$

(ii) $\text{LCM} \{ 3, 9 \}$

(iii) $\text{LCM} \{ 8, 12 \}$

[3 marks]

2.2 Exercise

Marks Available : 35

Question 1

Express as a single fraction

(i)
$$\frac{2(3x + 7)}{5} + \frac{3(2x + 1)}{2}$$

[3 marks]

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

[3 marks]

(iii) $\frac{4(x+1)}{7} + x$

Hint: $x = \frac{x}{1}$

[3 marks]

(iv) $\frac{8(2x+1)}{3} + \frac{5(3x+2)}{6}$

Hint: $\text{LCM}\{3, 6\} = 6$

[3 marks]

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

Careful: *double minus!*

[3 marks]

(vi) $\frac{3}{4} - \frac{3 - 2x}{6}$

Nasty!

[3 marks]

Question 2

GCSE Examination Question from June 2010, 4H, Q11 (Edexcel)

Simplify fully, $\frac{x}{6} + \frac{3x}{4}$

[3 marks]

Question 3

GCSE Examination Question from May 2008, 4H, Q23 (a)

Simplify, $\frac{x^2 - 9}{x^2 + 3x}$

[3 marks]

Question 4

GCSE Examination Question from November 2006, 4H, Q23

Simplify fully, $\frac{2x^2 - 5x - 12}{4x^2 - 9}$

[3 marks]

Question 5

GCSE Examination Question from May 2009, 3H, Q18

Simplify fully

$$\frac{5x^2 + 14x - 3}{50x^2 - 2}$$

[4 marks]

Question 6

GCSE Examination Question from November 2010, 4H, Q22 (Edexcel)

Simplify fully, $1 + \frac{x^2 + x - 6}{(x + 4)(x - 2)}$

[4 marks]

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Teachers may obtain detailed worked solutions to the exercises by email from mhh@shrewsbury.org.uk