

Lesson 4

GCSE Mathematics Algebraic Fractions

4.1 Equations involving fractions

In our work with adding and subtracting fractions we have seen that the LCM, the lowest common multiple, is an essential ingredient. The following example illustrates another situation where the key to an efficient solution is the LCM.

4.2 Numerical Denominators Example

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

The key solution technique is to multiply through by the LCM of the denominators

[3 marks]

4.3 Algebraic Denominators Example

Solve, $\frac{x}{x + 2} - \frac{1}{x} = 1$

The key solution technique is to multiply through by the LCM of the denominators

[4 marks]

4.4 Exercise

Marks Available:

Question 1

Solve, $\frac{2x + 1}{4} = \frac{x + 1}{3}$

[3 marks]

Question 2

Solve, $\frac{3x - 2}{3} = \frac{x - 3}{5}$

[3 marks]

Question 3

Solve, $\frac{2(x - 3)}{3} = \frac{3(x + 4)}{8}$

[3 marks]

Question 4

Solve, $\frac{x + 3}{7} - \frac{3(x - 2)}{14} = 1$

[3 marks]

Question 5

GCSE Examination Question from May 2012, 3H, Q9 (Edexcel)

- (a) Solve, $3(2x - 1) = 6$
Show clear algebraic working.

[3 marks]

- (b) Solve, $\frac{2y + 1}{3} = \frac{y - 2}{4}$
Show clear algebraic working.

[4 marks]

Question 6

GCSE Examination Question from June 2011, 3H, Q13 (Edexcel)

Solve, $\frac{2x - 1}{4} + \frac{x - 1}{5} = 2$

[4 marks]

Question 7

Solve, $\frac{x}{x - 1} + \frac{1}{x} = 1$

[4 marks]

Question 8

Simplify, $\frac{5x + 15}{x + 3}$

[2 marks]

Question 9

Beginning "LHS =" show that, $\frac{x - 2}{3} - \frac{x}{4} = \frac{x - 8}{12}$

[3 marks]

Question 10

Solve the equation, $\frac{x}{3} = \frac{x - 2}{5}$

[3 marks]

Question 11

Find the two solutions to the equation, $\frac{4}{x-1} - \frac{2}{x+2} = 1$

[5 marks]

Question 12

GCSE Examination Question from May 2012, 4H, Q21 (Edexcel)

Solve, $\frac{5}{(x+2)} + \frac{9}{(x-2)} = 2$

Show clear algebraic working.

[5 marks]

Question 13

Beginning "LHS =", show that, $\frac{3}{x-1} - \frac{2}{x+1} = \frac{x+8}{x^2-1}$

[5 marks]

Question 14

Find both solutions to the equation, $\frac{3}{x-1} - \frac{8}{x+2} = 1$

[5 marks]

Question 15

GCSE Examination Question from November 2008, 3H, Q18 (Edexcel)

Simplify fully, $\frac{2}{x+2} + \frac{x}{x^2+5x+6}$

[5 marks]

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