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, LCM { 3, 7 } = 21 so both denominators where 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)** LCM { 5, 6 }

(ii) LCM { 3, 9]

(iii) 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: LCM $\{3,\ 6\} = 6$

[3 marks]

(v) $\dfrac{2\,(4x + 5)}{3} - \dfrac{5\,(2x - 3)}{4}$ Careful: *double minus* !

[3 marks]

(vi) $\dfrac{3}{4} - \dfrac{3 - 2x}{6}$ *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, $\dfrac{2x^2 - 5x - 12}{4x^2 - 9}$

[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, $1 + \dfrac{x^2 + x - 6}{(x + 4)(x - 2)}$

[4 marks]