UNIT 12 *Formulae* Teaching Notes

Historical Background and Introduction

The unit follows on from the earlier algebraic units, namely Y7B, Unit 16 and Y8A, Unit 8 . It is crucial that pupils appreciate that algebra follows a set of precise rules – they are not arbitrary but based on a firm formulation of definitions and notations. Any confusion *must* be sorted out.

One absolutely vital concept that permeates all our work in Algebra is that of balancing the two sides of an equation; i.e. if $a = b$, then whatever you do to one side, you must do to the other side in order to keep the balance.

Routes	**Standard**	**Academic**	**Express**
12.1 Substitution 1	✓	✓	×
12.2 Substitution 2	✓	✓	✓
12.3 Linear Equations 1	✓	✓	✓
12.4 Linear Equations 2	✓	✓	✓
12.5 Non-Linear Equations	×	×	✓
12.6 Changing the Subject of a Formula	×	✓	✓

Language	**Standard**	**Academic**	**Express**
B O D M A S	✓	✓	✓
Non-linear equations	×	×	✓
Subject of formula	×	✓	✓

Misconceptions

- It is very easy to confuse signs when substituting in formulae; say $\frac{a}{b}$ with $a = 4,\ b = -2$, this is equal to $\frac{4}{(-2)} = \frac{-4}{2} = -2$; and if $a = -4,\ b = -2$, then $\frac{a}{b} = \frac{(-4)}{(-2)} = 2$
  (i.e. negative no. ÷ negative no. = positive no.)
- Whatever you do to one side of an equation, you *must* do the same to the other side.
  e.g. $x + 2 = 6 \Rightarrow x + 2 - 2 = 6 - 2$
  $\Rightarrow x + 0 = 4$
  $\Rightarrow x = 4$
  rather than $x = 6 + 2 = 8$

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- Similarly, if $a\,x = b$, then $x = \dfrac{b}{a}$ since you are dividing both side by *a*.

  e.g. $4\,x = 12 \Rightarrow \dfrac{4\,x}{4} = \dfrac{12}{4}$

  $\Rightarrow x = 3$

  rather than $x = 48$.

  $\dfrac{1}{2}x = 6 \Rightarrow x = 12$, since $2 \times \left(\dfrac{1}{2}x\right) = 2 \times 6$

  $x = 12$

  rather than $x = 3$.

Challenging Questions

The following questions are more challenging than others in the same section:

	Section	*Question No.*	*Page*
Practice Book Y8B	12.2	11	11
" "	12.4	10	19
" "	12.6	10	24