

# Book 9C contents

**FM: indicates sections (up to level 6) that address functional mathematics**

## Oral and mental starters

(Teacher's guide only) Ideas for teacher-led activities for use at the start of a lesson

### 1 Circumference of a circle 4 **FM: all**

Circumference from diameter or radius and the reverse process; problems involving part of the circumference

### 2 Solving equations 13

Linear equations including with a linear factor in brackets or a simple algebraic fraction; forming and solving equations to solve puzzles; simple cases with  $x^2$ ,  $x^3$  or  $x^4$

### 3 Rates 21 **FM: all**

Finding the gradient of a straight-line graph and interpreting it as a rate (including as a speed on a distance–time graph); solving problems involving rates

### 4 Vectors 28

Column vectors; simple problems with more than one vector; addition of column vectors

### 5 Manipulation 34

Dealing with expressions with powers of a variable and where two variables are multiplied together; factorising; equivalence, addition and subtraction of algebraic fractions; showing simple general statements to be true or false; finding expressions that represent numbers of objects in a sequence of spatial patterns, explaining why they work

### 6 Area of a circle 47 **FM: ABC**

Finding area from radius and radius from area; revision of circumference; area problems involving parts of circles; use of exact values in terms of  $\pi$ ; volume and surface area of a cylinder

### Review 1 55

### 7 Over to you 57

Problems for which the pupil may need to try a number of approaches to find one that works and is expected to provide an explanation

### 8 Trial and improvement 59

Solving problems and equations by trial and improvement to an accuracy of two decimal places; the use of a spreadsheet

### 9 Exploring Pascal's triangle 63

Situations that lead to Pascal's triangle and number patterns that arise from it

### 10 Fractions and probability 64

Multiplication and division by a fraction; the equivalence of '×' and 'of'; reciprocals; probabilities for events that are or are not mutually exclusive

### 11 Linear equations and graphs 73

Relating a linear graph to its equation; explicit and implicit forms of the equation; parallel linear graphs; intersecting linear graphs to represent simultaneous equations

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**12 Using and misusing statistics 81 FM: all**

Criticising and improving upon misleadingly presented data; avoiding bias and other faults in statistical surveys

**Review 3 147**

**Index 151**

**13 Pythagoras's theorem 86**

Use and proof

**14 Simultaneous equations 95**

Solving by considering the difference between the two equations, including multiplying one equation or both by some number

**Review 2 103**

**15 Spot the errors 106**

Correcting common errors and explaining why they are made

**16 Changing the subject 108**

Substituting into a formula and solving the resulting equation; rearranging a formula to make a different letter the subject, including formulas with more than two letters on the right-hand side or with a squared term

**17 Similar shapes 112**

Scale factors to enlarge and scale down; internal ratios; similarity

**18 Functions and graphs 123**

Drawing graphs of simple quadratic, cubic and reciprocal functions

**19 Inequalities 127**

Notation; representation on a number line; combined inequalities; writing inequalities given in words in symbols

**20 More manipulation 134**

Simplifying expressions including quadratics given as the product of two pairs of brackets; proving general statements

**21 Quadratic sequences 141**

Investigating; forming from a rule; finding a rule for a given sequence by considering differences