

# Book 9S 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 Solids 4

Identifying and drawing cross-sections of a solid; volume of a prism; planes of symmetry of solids

### 2 Equivalent expressions 13

Expanding expressions that have one pair of brackets as a factor and factorising expressions into this form; simple algebraic fractions; showing that a simple statement is generally true, sometimes true or never true

### 3 Fractions 20

Adding, subtracting and multiplying fractions; equivalence of 'of' and '×'; inverse of multiplication by a fraction

### 4 As time goes by 27 **FM: ACD**

Drawing and interpreting graphs that show a value (water level in containers, distance, speed) changing over time

### 5 Working with rules 37

Solving simple equations and rearranging simple formulas (including those with brackets) using inverse flow diagrams

### Review 1 44

### 6 Circumference of a circle 46 **FM: all**

Circumference from diameter or radius and the reverse process

### 7 Clue-sharing 54

Revision of factors, multiples, prime numbers, square numbers and powers; solving problems by thinking logically

### 8 Enlargement 55

Enlarging a shape from a centre of enlargement using the 'ray' method; working out coordinates; finding scale factors

### 9 Over to you 61

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

### 10 Straight-line graphs 63

Plotting straight-line graphs; positive and negative gradient; relating a graph to an equation in the form  $y = mx + c$  or implicit form

### 11 Points, lines and arcs 73

The locus as a set of points that follow some rule; accurate scale drawing and its use to solve problems

### 12 Percentage problems 77 **FM: all**

Expressing an increase or decrease as a percentage; solving a variety of percentage problems

### Review 2 83

### 13 Ratio and proportion 85

A ratio as a single number; use of ratios to decide whether two variables are in direct proportion; solving a problem involving direct proportion by forming and solving an equation

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**14 Angles of a polygon 91**

Sum of the interior and of the exterior angles of a polygon; regular polygons

**15 Using and misusing statistics 99 FM: all**

Time series graph; two-way table; mean, median and range; grouped frequency chart; stem-and-leaf table; ideas for statistical surveys; misleading statistical charts

**16 Linear sequences 107**

Continuing linear and non-linear sequences; finding the  $n$ th term for an increasing or decreasing linear sequence

**17 Decimals 115 FM: AD**

Revision of adding and subtracting decimals; multiplying and dividing decimals by integers and decimals; recurring decimals

**18 Area of a circle 127 FM: ABC**

Finding area from radius and radius from area; revision of circumference; area problems involving parts of circles

**Review 3 132****19 The right connections 135 FM: all**

Scatter diagrams; degree of positive or negative correlation; line of best fit

**20 Algebra problems 144**

Forming and solving equations with subtracted unknowns to solve puzzles

**21 Angles 151**

Revision of angle relationships; corresponding and alternate angles with parallel lines

**22 Transformations 156**

Translation, reflection, rotation and combinations of these transformations including use of coordinates

**23 Trial and improvement 167**

Solving problems by trial and improvement where the answer is a whole number, an exact decimal or a rounded decimal; the use of a spreadsheet

**24 Spot the errors 174**

Correcting common errors and explaining why they are made

**25 Stretchers 178**

Challenge questions for which pupils can use their own methods

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