

	Numbers and the number system	Book 7H pages	Book 8H pages	Book 9H pages
Level 8	<ul style="list-style-type: none"> understand the equivalence between recurring decimals and fractions 		194-195	60-61
Level 7	<ul style="list-style-type: none"> understand and use proportionality 			
Level 6	<ul style="list-style-type: none"> use the equivalence of fractions, decimals and percentages to compare proportions 	89-94 217-219 271	193-198 322	11-12
Level 5	<ul style="list-style-type: none"> use understanding of place value to multiply and divide whole numbers and decimals by 10, 100 and 1000 and explain the effect round decimals to the nearest decimal place and order negative numbers in context recognise and use number patterns and relationships use equivalence between fractions and order fractions and decimals reduce a fraction to its simplest form by cancelling common factors understand simple ratio 	25 293-294 45-50 81-82 81-83 227-228		1-2 124-125 11-12 6-7
	Calculating	Book 7H pages	Book 8H pages	Book 9H pages
Level 8	<ul style="list-style-type: none"> use fractions or percentages to solve problems involving repeated proportional changes or the calculation of the original quantity given the result of a proportional change solve problems involving calculating with powers, roots and numbers expressed in standard form, checking for correct order of magnitude and using a calculator as appropriate 			142-145 64-70 71-77
Level 7	<ul style="list-style-type: none"> calculate the result of any proportional change using multiplicative methods understand the effects of multiplying and dividing by numbers between 0 and 1 add, subtract, multiply and divide fractions 		74-75 9-17	138-141 56-60

	<ul style="list-style-type: none"> • make and justify estimates and approximations of calculations; estimate calculations by rounding numbers to one significant figure and multiplying and dividing mentally • use a calculator efficiently and appropriately to perform complex calculations with numbers of any size, knowing not to round during intermediate steps of a calculation 		70-75	123-128
			45-50	7-9
Level 6	<ul style="list-style-type: none"> • calculate percentages and find the outcome of a given percentage increase or decrease • divide a quantity into two or more parts in a given ratio and solve problems involving ratio and direct proportion • use proportional reasoning to solve a problem, choosing the correct numbers to take as 100% or as a whole • add and subtract fractions by writing them with a common denominator, calculate fractions of quantities (fraction answers), multiply and divide an integer by a fraction 	223-225 229 219-221 87-89	199-202 325-326 281-287 9-17 59-60	 6-7 56-57
Level 5	<ul style="list-style-type: none"> • use known facts, place value, knowledge of operations and brackets to calculate including using all four operations with decimals to two places • use a calculator where appropriate to calculate fractions / percentages of quantities / measurements • understand and use an appropriate non-calculator method for solving problems that involve multiplying and dividing any three digit number by any two digit number • solve simple problems involving ordering, adding, subtracting negative numbers in context • solve simple problems involving ratio and direct proportion • apply inverse operations and approximate to check answers to problems are of the correct magnitude 	22-24 28-33 34-43 142-145 273 84-86 221-222 224 274 14-17 140-142 272 231-234 225-228 294-296	65-69	1-2 7-9 11 6-7 3

	Algebra	Book 7H pages	Book 8H pages	Book 9H pages
Level 8	<ul style="list-style-type: none"> factorise quadratic expressions including the difference of two squares, eg $x^2 - 9 = (x + 3)(x - 3)$ manipulate algebraic formulae, equations and expressions, finding common factors and multiplying two linear expressions derive and use more complex formulae and change the subject of a formula evaluate algebraic formulae, substituting fractions, decimals and negative numbers solve inequalities in two variables and find the solution set sketch, interpret and identify graphs of linear, quadratic, cubic and reciprocal functions, and graphs that model real situations understand the effect on a graph of addition of (or multiplication by) a constant 			21-22 44-48 62-63 47-48 287-289 237 251-253 270-274
Level 7	<ul style="list-style-type: none"> square a linear expression, and expand and simplify the product of two linear expressions of the form $(x \pm n)$ and simplify the corresponding quadratic expression use algebraic and graphical methods to solve simultaneous linear equations in two variables solve inequalities in one variable and represent the solution set on a number line use formulae from mathematics and other subjects; substitute numbers into expressions and formulae; derive a formula and, in simple cases, change its subject find the next term and nth term of quadratic sequences and functions and explore their properties plot graphs of simple quadratic and cubic functions, eg $y = x^2$, $y = 3x^2 + 4$, $y = x^3$ 		146-153 36-41 299-300 278	44-48 196-204 232-237 13-21 63-64 65-67 285-286 120-122 272-274

Level 6	<ul style="list-style-type: none"> use systematic trial and improvement methods and ICT tools to find approximate solutions to equations such as $x^3 + x = 20$ construct and solve linear equations with integer coefficients, using an appropriate method generate terms of a sequence using term-to-term and position-to-term definitions of the sequence, on paper and using ICT; write an expression to describe the nth term of an arithmetic sequence plot the graphs of linear functions, where y is given explicitly in terms of x; recognise that equations of the form $y = mx + c$ correspond to straight-line graphs construct functions arising from real life problems and plot their corresponding graphs; interpret graphs arising from real situations 	237-243 313-315	216-228 302-309	89-95 13-21 115-120
Level 5	<ul style="list-style-type: none"> construct, express in symbolic form, and use simple formulae involving one or two operations use and interpret co-ordinates in all four quadrants 	109-121 235-236 244-245		
	Shape, space and measure	Book 7H pages	Book 8H pages	Book 9H pages
Level 8	<ul style="list-style-type: none"> understand and use congruence and mathematical similarity understand and use trigonometrical relationships in right-angled triangles and use these to solve problems, including those involving bearings understand the difference between formulae for perimeter, area and volume in simple contexts by considering dimensions 			23-25 290-297 216-231
Level 7	<ul style="list-style-type: none"> understand and apply Pythagoras' theorem when solving problems in 2-D calculate lengths, areas and volumes in plane shapes and right prisms 		264-270 314-320	109-111 171-181

	<ul style="list-style-type: none"> enlarge 2-D shapes, given a centre of enlargement and a fractional scale factor on paper and using ICT; recognise the similarity of the resulting shapes find the locus of a point that moves according to a given rule, both by reasoning and using ICT recognise that measurements given to the nearest whole unit may be inaccurate by up to one half of the unit in either direction understand and use measures of speed (and other compound measures such as density or pressure) to solve problems 		244-245	
			156-157	280-285
				129-132
				169-171 274-279
Level 6	<ul style="list-style-type: none"> classify quadrilaterals by their geometric properties solve geometrical problems using properties of angles, of parallel and intersecting lines, and of triangles and other polygons identify alternate and corresponding angles; understand a proof that the sum of the angles of a triangle is 180° and of a quadrilateral is 360° devise instructions for a computer to generate and transform shapes and paths visualise and use 2-D representations of 3-D objects enlarge 2-D shapes, given a centre of enlargement and a positive whole-number scale factor know that translations, rotations and reflections preserve length and angle and map objects onto congruent images use straight edge and compasses to do standard constructions 	211-214		26-29
		105-107 138-140 263-265 329-330	79-85 234-235	27-33 106-107
		104-107	79-84	29-31 106-107
			339-342	132-137
			238-245	160-161
		209-210 331-333	127-130 208-215	111-112 158-159 161-163
		54-60	155 158-160	25

	<ul style="list-style-type: none"> deduce and use formulae for the area of a triangle and parallelogram, and the volume of a cuboid; calculate volumes and surface areas of cuboids know and use the formulae for the circumference and area of a circle 	297-302	17-23 310-314	171-175
Level 5	<ul style="list-style-type: none"> use a wider range of properties of 2-D and 3-D shapes and identify all the symmetries of 2-D shapes use language associated with angle and know and use the angle sums of a triangle and that of angles at a point reason about position and movement and transform shapes measure and draw angles to the nearest degree, when constructing models and drawing or using shapes read and interpret scales on a range of measuring instruments, explaining what each labelled division represents solve problems involving the conversion of units and make sensible estimates of a range of measures in relation to everyday situations understand and use the formula for the area of a rectangle and distinguish area from perimeter 	258-261 334-336	96-97 99-103	257 267
	Handling Data	Book 7H pages	Book 8H pages	Book 9H pages
Level 8	<ul style="list-style-type: none"> estimate and find the median, quartiles and interquartile range for large data sets, including using a cumulative frequency diagram compare two or more distributions and make inferences, using the shape of the distribution know when to add or multiply two probabilities 	97-99 207-208	22	321-327
		51-53		
				42-43
				40-41

	<ul style="list-style-type: none"> • use tree diagrams to calculate probabilities of combinations of independent events 			
Level 7	<ul style="list-style-type: none"> • suggest a problem to explore using statistical methods, frame questions and raise conjectures; identify possible sources of bias and plan how to minimise it • select, construct and modify on paper and using ICT suitable graphical representations to progress an enquiry including frequency polygons and lines of best fit on scatter graphs • estimate the mean, median and range of a set of grouped data and determine the modal class, selecting the statistic most appropriate to the line of enquiry • compare two or more distributions and make inferences, using the shape of the distributions and measures of average and range • understand relative frequency as an estimate of probability and use this to compare outcomes of an experiment • examine critically the results of a statistical enquiry, and justify the choice of statistical representation in written presentation 		343-345	186-188
				38-41 86-88
				36-38
				40-41
			336-337	239-241
			343-345	182-188
Level 6	<ul style="list-style-type: none"> • design a survey or experiment to capture the necessary data from one or more sources; design, trial and, if necessary, refine data collection sheets; construct tables for large discrete and continuous sets of raw data, choosing suitable class intervals; design and use two way tables • select, construct and modify, on paper and using ICT: <ul style="list-style-type: none"> - pie charts for categorical data - bar charts and frequency diagrams for discrete and continuous data - simple time graphs for time series - scatter graphs <p>and identify which are most useful in the context of the problem</p>	179	343-345	182-188
		176-177	187-190	164
		169-171	186-190	36-39
		283-285	179-185 191	85-88

	<ul style="list-style-type: none"> find and record all possible mutually exclusive outcomes for single events and two successive events in a systematic way know that the sum of probabilities of all mutually exclusive outcomes is 1 and use this when solving problems communicate interpretations and results of a statistical survey using selected tables, graphs and diagrams in support 		332-335	244-246
			327-332	246-248
			344-345	
Level 5	<ul style="list-style-type: none"> ask questions, plan how to answer them and collect the data required in probability, select methods based on equally likely outcomes and experimental evidence, as appropriate understand and use the probability scale from 0 to 1 understand and use the mean of discrete data and compare two simple distributions, using the range and one of mode, median or mean understand that different outcomes may result from repeating an experiment interpret graphs and diagrams, including pie charts, and draw conclusions create and interpret line graphs where the intermediate values have meaning 	179		
		181-187 275-282		242-244
		180-181		
		72-80		34-36
		181-182		
		165-169 174-175 178		164-166
		172-174 283-285		
	Using and applying mathematics	Book 7H pages	Book 8H pages	Book 9H pages
Level 8	<ul style="list-style-type: none"> develop and follow alternative methods and approaches reflect on lines of enquiry when exploring mathematical tasks select and combine known facts and problem solving strategies to solve problems of increasing complexity convey mathematical meaning through precise and consistent use of symbols 			254-260
				182-188 267-268
				96-104 230-231 254-260
				47-48 254-260

	<ul style="list-style-type: none"> • examine generalisations or solutions reached in an activity, commenting constructively on the reasoning and logic or the process employed, or the results obtained • distinguish between practical demonstration or proof; know underlying assumptions, recognising their importance and limitations, and the effect of varying them 			254-260 267-268
Level 7	<ul style="list-style-type: none"> • solve increasingly demanding problems and evaluate solutions; explore connections in mathematics across a range of contexts; number, algebra, shape, space and measures, and handling data; refine or extend the mathematics used to generate fuller solutions • give reasons for choice of presentation, explaining selected features and showing insight into the problems structure • justify generalisations, arguments or solutions • appreciate the difference between mathematical explanation and experimental evidence 	94 252 320	23 170 226-228 234-235 255 299-300 170 299-300 343-345 130 170 234-235 255 299-300 23 83-85 170 234-235 336	15-16 20-21 47-48 178-181 69-71 189-195 74, 76 202-213 78-84 230-231 96-104 254-260 127-128 260-266 145-155 298 49-54 182-188 254-260 15-16 254-260
Level 6	<ul style="list-style-type: none"> • solve problems and carry through substantial tasks by breaking them into smaller, more manageable tasks, using a range of efficient techniques, methods and resources, including ICT; give solutions to an appropriate degree of accuracy • interpret, discuss and synthesise information presented in a variety of mathematical forms 	94 157 320 167-179 189-203 247-252 283-289 303-309 340-344	170 234-235 255 299-300 20-22 27 36-41 51-55 81-83 97-105 115-118 129-130 135-136 150 156-157 161-165 183-191 195 203-206	15-16 94-95 20-21 45 49-54 54-55 78-84 96-104 104-105 117-120 155-157 178-181

	<ul style="list-style-type: none"> present a concise, reasoned argument, using symbols, diagrams, graphs and related explanatory texts use logical argument to establish the truth of a statement 	<p>61 94 157 189-197 215 252 282 320</p> <p>94 252 282 320</p>	<p>212-215 223-228 229-235 252-255 257-263 292-300 319-320 335-336 343-349</p> <p>23 83-85 89 130 150 170 223-228 234-235 255 275 299-300 343-345</p> <p>23 83-85 130 170 195 218 234-235 252-255 343-345</p>	<p>20-21 49-54</p> <p>15-16</p>
Level 5	<ul style="list-style-type: none"> identify and obtain necessary information to carry through a task and solve mathematical problems check results, considering whether these are reasonable solve word problems and investigations from a range of contexts 	<p>10 94 116-117 138-140 146 157 189-197 252 282</p> <p>ongoing throughout the book</p> <p>38 58-60 61 62-68 94 116-117 123-128 133 146</p>		

	<ul style="list-style-type: none"> • show understanding of situations by describing them mathematically using symbols, words and diagrams • draw simple conclusions of their own and give an explanation of their reasoning 	157 189-203 215 247-252 262-265 282 303-309 320 340-344 61 94 111 116-117 157 241-243 252 262-265 316-320 61 67 76-78 94 116-117 133 157 189-197 215 252 262-265 282 308 320		
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