1. Number

Weeks 1–6

数

They should be able to

1. Identify and use: • natural numbers • integers (positive, zero and negative) • prime numbers • square numbers • cube numbers • common factors • common multiples • rational and irrational numbers • reciprocals.
2. Understand and use set language, notation and Venn diagrams to describe sets.
3. Calculate with the following: • squares • square roots • cubes • cube roots • other powers and roots of numbers.
4. Use the language and notation of the following in appropriate contexts: • proper fractions • improper fractions • mixed numbers • decimals • percentages.
5. Recognise equivalence and convert between these forms.
6. Order quantities by magnitude and demonstrate familiarity with the symbols $=, \neq, >, <, \geqslant$ and $\leqslant$.
7. Use the four operations for calculations with integers, fractions and decimals, including correct ordering of operations and use of brackets.
8. Understand and use indices (positive, zero and negative integers).
9. Understand and use the rules of indices.
10. Use the standard form $A \times 10^n$ where n is a positive or negative integer and $1 \leqslant A < 10$.
11. Convert numbers into and out of standard form.
12. Calculate with values in standard form.
13. Round values to a specified degree of accuracy.
14. Make estimates for calculations involving numbers, quantities and measurements.
15. Round answers to a reasonable degree of accuracy in the context of a given problem.
16. Give upper and lower bounds for data rounded to a specified accuracy.
17. Understand and use ratio and proportion to:
18. • give ratios in their simplest form
19. • divide a quantity in a given ratio
20. • use proportional reasoning and ratios in context.
21. Use common measures of rate.
22. Apply other measures of rate.
23. Solve problems involving average speed.
24. Calculate a given percentage of a quantity.
25. Express one quantity as a percentage of another.
26. Calculate percentage increase or decrease.
27. Calculate with simple and compound interest.
28. Use a calculator efficiently.
29. Enter values appropriately on a calculator.
30. Interpret the calculator display appropriately.
31. Calculate with time: seconds (s), minutes (min), hours (h), days, weeks, months, years, including the relationship between units.
32. Calculate times in terms of the 24-hour and 12-hour clock.
33. Read clocks and timetables.
34. Calculate with money.
35. Convert from one currency to another.
36. Identify and use: • natural numbers • integers (positive, zero and negative) • prime numbers • square numbers • cube numbers • common factors • common multiples • rational and irrational numbers • reciprocals.

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37. Understand and use set language, notation and Venn diagrams to describe sets and represent relationships between sets.
38. Calculate with the following: • squares • square roots • cubes • cube roots • other powers and roots of numbers.
39. Use the language and notation of the following in appropriate contexts: • proper fractions • improper fractions • mixed numbers • decimals • percentages.
40. Recognise equivalence and convert between these forms.
41. Order quantities by magnitude and demonstrate familiarity with the symbols $=, \neq, >, <, \geqslant$ and $\leqslant$.
42. Use the four operations for calculations with integers, fractions and decimals, including correct ordering of operations and use of brackets.
43. Understand and use indices (positive, zero, negative, and fractional).
44. Understand and use the rules of indices.
45. Use the standard form $A \times 10^n$ where n is a positive or negative integer and $1 \leqslant A < 10$.
46. Convert numbers into and out of standard form.
47. Calculate with values in standard form.
48. Round values to a specified degree of accuracy.
49. Make estimates for calculations involving numbers, quantities and measurements.
50. Round answers to a reasonable degree of accuracy in the context of a given problem.
51. Give upper and lower bounds for data rounded to a specified accuracy.
52. Find upper and lower bounds of the results of calculations which have used data rounded to a specified accuracy.
53. Understand and use ratio and proportion to:
54. • give ratios in their simplest form
55. • divide a quantity in a given ratio
56. • use proportional reasoning and ratios in context.
57. Use common measures of rate.
58. Apply other measures of rate.
59. Solve problems involving average speed.
60. Calculate a given percentage of a quantity.
61. Express one quantity as a percentage of another.
62. Calculate percentage increase or decrease.
63. Calculate with simple and compound interest.
64. Calculate using reverse percentages.
65. Use a calculator efficiently.
66. Enter values appropriately on a calculator.
67. Interpret the calculator display appropriately.
68. Calculate with time: seconds (s), minutes (min), hours (h), days, weeks, months, years, including the relationship between units.
69. Calculate times in terms of the 24-hour and 12-hour clock.
70. Read clocks and timetables.
71. Calculate with money.
72. Convert from one currency to another.
73. Use exponential growth and decay.
74. Understand and use surds, including simplifying expressions.
75. Rationalise the denominator.

Stage	Use	Your notes
Starter 10 min · retrieval practice	Topic quiz 01 (10 questions, answers on sheet 2) Starter quiz 1 – past-paper questions	
Teach the new content	Handout 01 Slide deck 01 Vocabulary list 01	
Practice guided then independent	Exercise sheets C1.1, C1.2, C1.3, C1.4, C1.5, C1.6, C1.7, C1.8, C1.9, C1.10, C1.11, C1.12, C1.13, C1.14, C1.15, C1.16, E1.1, E1.2, E1.3, E1.4, E1.5, E1.6, E1.7, E1.8, E1.9, E1.10, E1.11, E1.12, E1.13, E1.14, E1.15, E1.16, E1.17, E1.18 Past-paper sheets E1.1, E1.2, E1.3, E1.4, E1.7, E1.8, E1.10, E1.12	
Check before they leave	Unit test 1 (with mark scheme)	
Homework set from the Library	Any unused exercise sheet above Holiday homework pack	

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2. Algebra and graphs

Weeks 7–12

代数与图像

They should be able to

1. Know that letters can be used to represent generalised numbers.
2. Substitute numbers into expressions and formulas.
3. Simplify expressions by collecting like terms.
4. Expand products of algebraic expressions.
5. Factorise by extracting common factors.
6. Understand and use indices (positive, zero and negative).
7. Understand and use the rules of indices.
8. Construct simple expressions, equations and formulas.
9. Solve linear equations in one unknown.
10. Solve simultaneous linear equations in two unknowns.
11. Change the subject of simple formulas.
12. Represent and interpret inequalities, including on a number line.
13. Continue a given number sequence or pattern.
14. Recognise patterns in sequences, including the term-to-term rule, and relationships between different sequences.
15. Find and use the nth term of the following sequences: (a) linear (b) simple quadratic (c) simple cubic.
16. Use and interpret graphs in practical situations including travel graphs and conversion graphs.
17. Draw graphs from given data.
18. Construct tables of values, and draw, recognise and interpret graphs for functions of the following forms: • $ax+b$ • $\pm x^2+ax+b$ • $\frac{a}{x}$ $(x \neq 0)$ where a and b are integer constants.
19. Solve associated equations graphically, including finding and interpreting roots by graphical methods.
20. Recognise, sketch and interpret graphs of the following functions: (a) linear (b) quadratic.
21. Know that letters can be used to represent generalised numbers.
22. Substitute numbers into expressions and formulas.
23. Simplify expressions by collecting like terms.
24. Expand products of algebraic expressions.
25. Factorise by extracting common factors.
26. Factorise expressions of the form: • $ax+bx+kay+kby$ • $a^2x^2-b^2y^2$ • $a^2+2ab+b^2$ • ax^2+bx+c • ax^3+bx^2+cx.
27. Complete the square for expressions in the form ax^2+bx+c.
28. Manipulate algebraic fractions.
29. Factorise and simplify rational expressions.
30. Understand and use indices (positive, zero, negative and fractional).
31. Understand and use the rules of indices.
32. Construct expressions, equations and formulas.
33. Solve linear equations in one unknown.
34. Solve fractional equations with numerical and linear algebraic denominators.
35. Solve simultaneous linear equations in two unknowns.
36. Solve simultaneous equations, involving one linear and one non-linear.
37. Solve quadratic equations by factorisation, completing the square and by use of the quadratic formula.
38. Change the subject of formulas.
39. Represent and interpret inequalities, including on a number line.

40. Construct, solve and interpret linear inequalities.
41. Represent and interpret linear inequalities in two variables graphically.
42. List inequalities that define a given region.
43. Continue a given number sequence or pattern.
44. Recognise patterns in sequences, including the term-to-term rule, and relationships between different sequences.
45. Find and use the nth term of sequences.
46. Express direct and inverse proportion in algebraic terms and use this form of expression to find unknown quantities.
47. Use and interpret graphs in practical situations including travel graphs and conversion graphs.
48. Draw graphs from given data.
49. Apply the idea of rate of change to simple kinematics involving distance–time and speed–time graphs, acceleration and deceleration.
50. Calculate distance travelled as area under a speed–time graph.
51. Construct tables of values, and draw, recognise and interpret graphs for functions of the following forms: • ax^n (includes sums of no more than three of these) • $ab^x + c$ where $n = -2, -1, -\frac{1}{2}, 0, \frac{1}{2}, 1, 2, 3$; a and c are rational numbers; and b is a positive integer.
52. Solve associated equations graphically, including finding and interpreting roots by graphical methods.
53. Draw and interpret graphs representing exponential growth and decay problems.
54. Recognise, sketch and interpret graphs of the following functions: (a) linear (b) quadratic (c) cubic (d) reciprocal (e) exponential.
55. Estimate gradients of curves by drawing tangents.
56. Use the derivatives of functions of the form ax^n, where a is a rational constant and n is a positive integer or zero, and simple sums of not more than three of these.
57. Apply differentiation to gradients and stationary points (turning points).
58. Discriminate between maxima and minima by any method.
59. Understand functions, domain and range and use function notation.
60. Understand and find inverse functions $f^{-1}(x)$.
61. Form composite functions as defined by $gf(x) = g(f(x))$.

Stage	Use	Your notes
Starter 10 min · retrieval practice	Topic quiz 02 (10 questions, answers on sheet 2) Starter quiz 2 – past-paper questions	
Teach the new content	Handout 02 Slide deck 02 Vocabulary list 02	
Practice guided then independent	Exercise sheets C2.1, C2.2, C2.4, C2.5, C2.6, C2.7, C2.9, C2.10, C2.11, E2.1, E2.2, E2.3, E2.4, E2.5, E2.6, E2.7, E2.8, E2.9, E2.10, E2.11, E2.12, E2.13 Past-paper sheets E2.1, E2.2, E2.4, E2.5, E2.6, E2.10, E2.11	
Check before they leave	Unit test 2 (with mark scheme)	
Homework set from the Library	Any unused exercise sheet above Holiday homework pack	

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3. Coordinate geometry

Weeks 13–14

坐标几何

They should be able to

1. Use and interpret Cartesian coordinates in two dimensions.
2. Draw straight-line graphs for linear equations.
3. Find the gradient of a straight line.
4. Interpret and obtain the equation of a straight-line graph in the form $y = mx + c$.
5. Find the gradient and equation of a straight line parallel to a given line.
6. Use and interpret Cartesian coordinates in two dimensions.
7. Draw straight-line graphs for linear equations.
8. Find the gradient of a straight line.
9. Calculate the gradient of a straight line from the coordinates of two points on it.
10. Calculate the length of a line segment.
11. Find the coordinates of the midpoint of a line segment.
12. Interpret and obtain the equation of a straight-line graph.
13. Find the gradient and equation of a straight line parallel to a given line.
14. Find the gradient and equation of a straight line perpendicular to a given line.

Stage	Use	Your notes
Starter 10 min · retrieval practice	Topic quiz 03 (10 questions, answers on sheet 2) Starter quiz 3 – past-paper questions	
Teach the new content	Handout 03 Slide deck 03 Vocabulary list 03	
Practice guided then independent	Exercise sheets C3.1, C3.2, C3.3, C3.5, C3.6, E3.1, E3.2, E3.3, E3.4, E3.5, E3.6, E3.7 Past-paper sheets E3.1, E3.2	
Check before they leave	Unit test 3 (with mark scheme)	
Homework set from the Library	Any unused exercise sheet above Holiday homework pack	

4. Geometry

Weeks 15–18

几何

They should be able to

1. Use and interpret the following geometrical terms: • point • vertex • line • parallel • perpendicular • bearing • right angle • acute, obtuse and reflex angles • interior and exterior angles • similar • congruent • scale factor.
2. Use and interpret the vocabulary of: • triangles • special quadrilaterals • polygons • nets • simple solids.
3. Use and interpret the vocabulary of a circle.
4. Measure and draw lines and angles.
5. Construct a triangle, given the lengths of all sides, using a ruler and pair of compasses only.
6. Draw, use and interpret nets.
7. Draw and interpret scale drawings.
8. Use and interpret three-figure bearings.
9. Calculate lengths of similar shapes.
10. Recognise line symmetry and order of rotational symmetry in two dimensions.
11. Calculate unknown angles and give simple explanations using the following geometrical properties: • sum of angles at a point = 360° • sum of angles at a point on a straight line = 180° • vertically opposite angles are equal • angle sum of a triangle = 180° and angle sum of a quadrilateral = 360°.
12. Calculate unknown angles and give geometric explanations for angles formed within parallel lines: • corresponding angles are equal • alternate angles are equal • co-interior angles sum to 180° (supplementary).
13. Know and use angle properties of regular polygons.
14. Calculate unknown angles and give explanations using the following geometrical properties of circles: • angle in a semicircle = 90° • angle between tangent and radius = 90°.
15. Use and interpret the following geometrical terms: • point • vertex • line • plane • parallel • perpendicular • perpendicular bisector • bearing • right angle • acute, obtuse and reflex angles • interior and exterior angles • similar • congruent • scale factor.
16. Use and interpret the vocabulary of: • triangles • special quadrilaterals • polygons • nets • solids.
17. Use and interpret the vocabulary of a circle.
18. Measure and draw lines and angles.
19. Construct a triangle, given the lengths of all sides, using a ruler and pair of compasses only.
20. Draw, use and interpret nets.
21. Draw and interpret scale drawings.
22. Use and interpret three-figure bearings.
23. Calculate lengths of similar shapes.
24. Use the relationships between lengths and areas of similar shapes and lengths, surface areas and volumes of similar solids.
25. Solve problems and give simple explanations involving similarity.
26. Recognise line symmetry and order of rotational symmetry in two dimensions.
27. Recognise symmetry properties of prisms, cylinders, pyramids and cones.
28. Calculate unknown angles and give simple explanations using the following geometrical properties: • sum of angles at a point = 360° • sum of angles at a point on a straight line = 180° • vertically opposite angles are equal • angle sum of a triangle = 180° and angle sum of a quadrilateral = 360°.
29. Calculate unknown angles and give geometric explanations for angles formed within parallel lines: • corresponding angles are equal • alternate angles are equal • co-interior angles sum to 180° (supplementary).
30. Know and use angle properties of regular and irregular polygons.

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31. Calculate unknown angles and give explanations using the following geometrical properties of circles: • angle in a semicircle = 90° • angle between tangent and radius = 90° • angle at the centre is twice the angle at the circumference • angles in the same segment are equal • opposite angles of a cyclic quadrilateral sum to 180° (supplementary) • alternate segment theorem.
32. Use the following symmetry properties of circles: • equal chords are equidistant from the centre • the perpendicular bisector of a chord passes through the centre • tangents from an external point are equal in length.

Stage	Use	Your notes
Starter 10 min · retrieval practice	Topic quiz 04 (10 questions, answers on sheet 2) Starter quiz 4 – past-paper questions	
Teach the new content	Handout 04 Slide deck 04 Vocabulary list 04	
Practice guided then independent	Exercise sheets C4.1, C4.2, C4.3, C4.4, C4.5, C4.6, C4.7, E4.1, E4.2, E4.3, E4.4, E4.5, E4.6, E4.7, E4.8 Past-paper sheets E4.2, E4.4, E4.6, E4.7	
Check before they leave	Unit test 4 (with mark scheme)	
Homework set from the Library	Any unused exercise sheet above Holiday homework pack	

5. Mensuration

Weeks 19–20

测量

They should be able to

1. Use metric units of mass, length, area, volume and capacity in practical situations and convert quantities into larger or smaller units.
2. Carry out calculations involving the perimeter and area of a rectangle, triangle, parallelogram and trapezium.
3. Carry out calculations involving the circumference and area of a circle.
4. Carry out calculations involving arc length and sector area as fractions of the circumference and area of a circle, where the sector angle is a factor of 360°.
5. Carry out calculations and solve problems involving the surface area and volume of a: • cuboid • prism • cylinder • sphere • pyramid • cone.
6. Carry out calculations and solve problems involving perimeters and areas of: • compound shapes • parts of shapes.
7. Carry out calculations and solve problems involving surface areas and volumes of: • compound solids • parts of solids.
8. Use metric units of mass, length, area, volume and capacity in practical situations and convert quantities into larger or smaller units.
9. Carry out calculations involving the perimeter and area of a rectangle, triangle, parallelogram and trapezium.
10. Carry out calculations involving the circumference and area of a circle.
11. Carry out calculations involving arc length and sector area as fractions of the circumference and area of a circle.
12. Carry out calculations and solve problems involving the surface area and volume of a: • cuboid • prism • cylinder • sphere • pyramid • cone.
13. Carry out calculations and solve problems involving perimeters and areas of: • compound shapes • parts of shapes.
14. Carry out calculations and solve problems involving surface areas and volumes of: • compound solids • parts of solids.

Stage	Use	Your notes
Starter 10 min · retrieval practice	Topic quiz 05 (10 questions, answers on sheet 2) Starter quiz 5 – past-paper questions	
Teach the new content	Handout 05 Slide deck 05 Vocabulary list 05	
Practice guided then independent	Exercise sheets C5.1, C5.2, C5.3, C5.4, C5.5, E5.1, E5.2, E5.3, E5.4, E5.5 Past-paper sheets E5.3, E5.4	
Check before they leave	Unit test 5 (with mark scheme)	
Homework set from the Library	Any unused exercise sheet above Holiday homework pack	

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6. Trigonometry

Weeks 21–23

三角学

They should be able to

1. Know and use Pythagoras' theorem.
2. Know and use the sine, cosine and tangent ratios for acute angles in calculations involving sides and angles of a right-angled triangle.
3. Solve problems in two dimensions using Pythagoras' theorem and trigonometry.
4. Know and use Pythagoras' theorem.
5. Know and use the sine, cosine and tangent ratios for acute angles in calculations involving sides and angles of a right-angled triangle.
6. Solve problems in two dimensions using Pythagoras' theorem and trigonometry.
7. Know that the perpendicular distance from a point to a line is the shortest distance to the line.
8. Carry out calculations involving angles of elevation and depression.
9. Know the exact values of: 1 $\sin x$ and $\cos x$ for $x = 0°, 30°, 45°, 60°$ and $90°$. 2 $\tan x$ for $x = 0°, 30°, 45°$ and $60°$.
10. Recognise, sketch and interpret the following graphs for $0° \leqslant x \leqslant 360°$: • $y = \sin x$ • $y = \cos x$ • $y = \tan x$.
11. Solve trigonometric equations involving $\sin x$, $\cos x$ or $\tan x$, for $0° \leqslant x \leqslant 360°$.
12. Use the sine and cosine rules in calculations involving lengths and angles for any triangle.
13. Use the formula area of triangle $= \frac{1}{2}ab\sin C$.
14. Carry out calculations and solve problems in three dimensions using Pythagoras' theorem and trigonometry, including calculating the angle between a line and a plane.

Stage	Use	Your notes
Starter 10 min · retrieval practice	Topic quiz 06 (10 questions, answers on sheet 2) Starter quiz 6 – past-paper questions	
Teach the new content	Handout 06 Slide deck 06 Vocabulary list 06	
Practice guided then independent	Exercise sheets C6.1, C6.2, E6.1, E6.2, E6.3, E6.4, E6.5, E6.6 Past-paper sheets E6.1, E6.2, E6.4	
Check before they leave	Unit test 6 (with mark scheme)	
Homework set from the Library	Any unused exercise sheet above Holiday homework pack	

7. Transformations and vectors

Weeks 24–25

变换与向量

They should be able to

1. Recognise, describe and draw the following transformations:
2. Reflection of a shape in a vertical or horizontal line.
3. Rotation of a shape about the origin, vertices or midpoints of edges of the shape, through multiples of 90°.
4. Enlargement of a shape from a centre by a scale factor.
5. Translation of a shape by a vector $\begin{pmatrix} x \\ y \end{pmatrix}$.

Stage	Use	Your notes
Starter 10 min · retrieval practice	Topic quiz 07 (10 questions, answers on sheet 2) Starter quiz 7 – past-paper questions	
Teach the new content	Handout 07 Slide deck 07 Vocabulary list 07	
Practice guided then independent	Exercise sheets C7.1, E7.1, E7.2, E7.3, E7.4 Past-paper sheets E7.1, E7.2	
Check before they leave	Unit test 7 (with mark scheme)	
Homework set from the Library	Any unused exercise sheet above Holiday homework pack	

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8. Probability

Weeks 26–27

概率

They should be able to

1. Understand and use the probability scale from 0 to 1.
2. Calculate the probability of a single event.
3. Understand that the probability of an event not occurring = 1 – the probability of the event occurring.
4. Understand relative frequency as an estimate of probability.
5. Calculate expected frequencies.
6. Calculate the probability of combined events using, where appropriate: • sample space diagrams • Venn diagrams • tree diagrams.
7. Understand and use the probability scale from 0 to 1.
8. Understand and use probability notation.
9. Calculate the probability of a single event.
10. Understand that the probability of an event not occurring = 1 – the probability of the event occurring.
11. Understand relative frequency as an estimate of probability.
12. Calculate expected frequencies.
13. Calculate the probability of combined events using, where appropriate: • sample space diagrams • Venn diagrams
14. • tree diagrams.
15. Calculate conditional probability using Venn diagrams, tree diagrams and tables.

Stage	Use	Your notes
Starter 10 min · retrieval practice	Topic quiz 08 (10 questions, answers on sheet 2) Starter quiz 8 – past-paper questions	
Teach the new content	Handout 08 Slide deck 08 Vocabulary list 08	
Practice guided then independent	Exercise sheets C8.1, C8.2, C8.3, E8.1, E8.2, E8.3, E8.4 Past-paper sheets E8.1, E8.4	
Check before they leave	Unit test 8 (with mark scheme)	
Homework set from the Library	Any unused exercise sheet above Holiday homework pack	

9. Statistics

Weeks 28–30

统计

They should be able to

1. Classify and tabulate statistical data.
2. Read, interpret and draw inferences from tables and statistical diagrams.
3. Compare sets of data using tables, graphs and statistical measures.
4. Appreciate restrictions on drawing conclusions from given data.
5. Calculate the mean, median, mode and range for individual data and distinguish between the purposes for which these are used.
6. Draw and interpret: (a) bar charts (b) pie charts (c) pictograms (d) stem-and-leaf diagrams (e) simple frequency distributions.
7. Draw and interpret scatter diagrams.
8. Understand what is meant by positive, negative and zero correlation.
9. Draw by eye, interpret and use a straight line of best fit.
10. Classify and tabulate statistical data.
11. Read, interpret and draw inferences from tables and statistical diagrams.
12. Compare sets of data using tables, graphs and statistical measures.
13. Appreciate restrictions on drawing conclusions from given data.
14. Calculate the mean, median, mode, quartiles, range and interquartile range for individual data and distinguish between the purposes for which these are used.
15. Calculate an estimate of the mean for grouped discrete or grouped continuous data.
16. Identify the modal class from a grouped frequency distribution.
17. Draw and interpret: (a) bar charts (b) pie charts (c) pictograms (d) stem-and-leaf diagrams (e) simple frequency distributions.
18. Draw and interpret scatter diagrams.
19. Understand what is meant by positive, negative and zero correlation.
20. Draw by eye, interpret and use a straight line of best fit.
21. Draw and interpret cumulative frequency tables and diagrams.
22. Estimate and interpret the median, percentiles, quartiles and interquartile range from cumulative frequency diagrams.
23. Draw and interpret histograms.
24. Calculate with frequency density.

Stage	Use	Your notes
Starter 10 min · retrieval practice	Topic quiz 09 (10 questions, answers on sheet 2) Starter quiz 9 – past-paper questions	
Teach the new content	Handout 09 Slide deck 09 Vocabulary list 09	
Practice guided then independent	Exercise sheets C9.1, C9.2, C9.3, C9.4, C9.5, E9.1, E9.2, E9.3, E9.4, E9.5, E9.6, E9.7 Past-paper sheets E9.2, E9.4, E9.6	
Check before they leave	Unit test 9 (with mark scheme)	
Homework set from the Library	Any unused exercise sheet above Holiday homework pack	

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