DAWOOD PUBLIC SCHOOL  
Course Outline 2016-17  
Class VII  
Mathematics

Books:  

Monthly Syllabus for The Year 2016 – 17

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<td>SEPTEMBER</td>
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<td>Graph Of Linear Equation Of Two Unknowns</td>
<td>Book – 2</td>
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<td>OCTOBER</td>
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<td>NOVEMBER</td>
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<td>JANUARY</td>
<td>Percentages</td>
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<td>Expansion and Factorisation Of Algebraic expressions</td>
<td>Book – 2</td>
<td>2 Weeks</td>
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<td>Maths Calendar Activity</td>
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<td>FEBRAURY</td>
<td>Expansion and Factorisation Of Algebraic expressions (Cont)</td>
<td>Book – 2</td>
<td>2 Weeks</td>
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<td>Pythagoras Theorem</td>
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<td>Maths Calendar Activity</td>
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<td>MARCH</td>
<td>Angle properties Of Polygons</td>
<td>Book – 1</td>
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<td>Statistics</td>
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<td>Maths Calendar Activity</td>
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<td>APRIL</td>
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<td>MAY</td>
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</table>
### Syllabus Content

**AUGUST**

**CHAPTER # 7 (Book 1):**
Algebraic Equations & Simple Inequalities  
Page Numbers: 139-166

**CHAPTER # 10 (Book 1):**
Ratio, Rate and Speed  
Page Numbers: 225-246

<table>
<thead>
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<th>Month</th>
<th>Theme or Topic</th>
<th>Subject Content</th>
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</thead>
</table>
| August | Algebraic Equations & Simple Inequalities  
Book 1, Chap No.7 | **Students should be able to:**  
• solve simple linear equations in one unknown;  
• solve fractional equations with numerical and linear algebraic denominators;  
• Construct simple formulae from given word expressions.  
• Express word expressions by algebraic methods.  
• Solve algebraic word problems using the various problems solving heuristics.  
• Use the symbols =, < or > correctly.  
• State and use the rules of simple inequality in problems | **Book – 1**  
Pg # 137 – 165  
**Workbook – 1**  
Pg # 56 – 60  
**Links:**  
[www.mathsisfun.com](http://www.mathsisfun.com)  
[www.openlysolved.org](http://www.openlysolved.org)  
[www.khanacademy.org](http://www.khanacademy.org) | • Making chart of key words of arithmetic operators.  
• Group activity of making algebraic equations by using verbal expression. |
<table>
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<tr>
<th>August</th>
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</thead>
<tbody>
<tr>
<td>• Ratio, Rate and Speed Book 1, Chap No. 10 Pg No.225-246</td>
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</table>

Students should be able to:
• demonstrate an understanding of the elementary ideas and notation of ratio, direct and inverse proportion and common measures of rate;
• divide a quantity in a given ratio;
• use scales in practical situations, calculate average speed;
• express direct and inverse proportion use this form of expression to find unknown quantities.
• calculate times in terms of the 12-hour and 24-hour clock;
• read clocks, dials and timetables.
• Apply the results:
  (a) Average speed = Distance travelled/Time taken,
  (b) Distance travelled = Average speed x Time taken,
  (c) Time taken = Distance travelled/Average speed, to calculate average speed, distance travelled and time taken respectively.
• Convert speed in km/h to m/s and vice versa.

<p>| |</p>
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<tr>
<td>• Book – 1 Pg # 225 – 246</td>
</tr>
<tr>
<td>• Workbook – 1 Pg # 85 – 90</td>
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Links:
• [www.mathsisfun.com](http://www.mathsisfun.com)
• [www.everythingmaths.com](http://www.everythingmaths.com)
• [www.khanacademy.org](http://www.khanacademy.org)

ATTAINABLE TARGETS

Algebraic Equations & Simple Inequalities:

- Simplify and compare two algebraic expressions.
- Write and solve algebraic inequalities.
- Solve for a variable when two expressions are equal.
- Write and solve an equation to solve a word problem.
- Recognize when an equation has no solution or infinite solutions
Example 1: Solve the following inequality and graph.

\[
\begin{align*}
\text{Step 1, Solve} & \quad -3x < 15 \\
& \quad -3x > 15 \\
& \quad \frac{-3}{3} > \frac{15}{3} \\
& \quad x > -5 \\
\text{Step 2: Graph} & \quad -5
\end{align*}
\]

Example 2: Solve the following inequality and graph

\[
\begin{align*}
\text{Step 1, Solve} & \quad a + 9 \geq 12 \\
& \quad a + 9 - 9 \geq 12 - 9 \\
& \quad a \geq 3 \\
\text{Step 2: Graph} & \quad -3
\end{align*}
\]

Ratio, Rate and Speed:

- Know the difference between ratio, rate, and unit rate.
- Calculate unit rates.
- Use proportional reasoning to solve word problems.
- Practice with simple unit price examples
\[ \text{Distance} = \text{Speed} \times \text{Time} \]

\[ \text{Time} = \frac{\text{Distance}}{\text{Speed}} \]

\[ \text{Speed} = \frac{\text{Distance}}{\text{Time}} \]

Step 1: Write the proportion

\[ \frac{20 \text{ inches}}{50 \text{ inches}} = \frac{30 \text{ inches}}{x} \]

Step 2: Multiply to find the cross products

\[ 20 \text{ in.} \times x = 50 \text{ ft.} \times 30 \text{ in.} \]

Step 3: Divide to find \( x \)

\[ \frac{20 \text{ in.} \times x}{20 \text{ in.}} = \frac{50 \text{ ft.} \times 30 \text{ in.}}{20 \text{ in.}} \]

\[ x = 75 \text{ ft} \]
### SEPTEMBER

**CHAPTER # 5 (Book 2):**
Simultaneous Linear Equations
Page Numbers: 153-174

**CHAPTER # 8 (Book 2):**
Graphs of linear equations in two unknowns
Page Numbers: 237-258

<table>
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<th>Subject Content</th>
<th>Resource</th>
<th>Activities</th>
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</thead>
</table>
| September | Simultaneous Linear Equations Book 2, Chap No.5 Pg No.153-174 | Students should be able to:  
- Solve a pair of simultaneous equations by the elimination method.  
- Solve a pair of simultaneous linear equations by adjusting the coefficients of one similar variable of both equations to be equal before elimination.  
- Solve a pair of simultaneous linear equations by using the substitution method.  
- solve fractional equations with numerical and linear algebraic denominators;  
- solve simultaneous linear equations in two unknowns; | Book -2  
Pg # 153 – 174  
Workbook – 2  
Pg # 51 – 57  
Links:  
www.khanacademy.org  
www.math-only-math.com |
<table>
<thead>
<tr>
<th>September</th>
<th>Students should be able to:</th>
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<td>Graphs of linear equations in two unknowns Book 2, Chap No. 8 Pg No. 237-258</td>
<td>• Select appropriate scales for drawing graphs.</td>
</tr>
<tr>
<td></td>
<td>• Construct a table of values for x and y for a given linear equation.</td>
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<td></td>
<td>• Plot the points given/found on a Cartesian plane.</td>
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<td></td>
<td>• Identify y = c as the equation of a straight line graph drawn passing through a point (h, c) where h is any constant, and parallel to x-axis.</td>
</tr>
<tr>
<td></td>
<td>• Identify x = a as the equation of a straight line graph drawn passing through a point (a, k) where k is any constant and parallel to y-axis.</td>
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<td>• calculate the gradient of a straight line from the coordinates of two points on it;</td>
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<tr>
<td></td>
<td>• interpret and obtain the equation of a straight line graph in the form y = mx + c;</td>
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<td></td>
<td>• solve simultaneous equations graphically.</td>
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<td></td>
<td>• collect, classify and tabulate statistical data; read, interpret and draw simple inferences from tables and statistical diagrams;</td>
</tr>
<tr>
<td></td>
<td>• Book – 2 Pg # 237 – 258</td>
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<td></td>
<td>• Workbook – 2 Pg # 85 – 89</td>
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<tr>
<td></td>
<td>Links:</td>
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<tr>
<td></td>
<td>• <a href="http://www.purplemath.com">www.purplemath.com</a></td>
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<td></td>
<td>• <a href="http://www.mathsisfun.com">www.mathsisfun.com</a></td>
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<tr>
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<td>• <a href="http://www.khanacademy.org">www.khanacademy.org</a></td>
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<td>• Activity of making alien mask on square grid.</td>
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**Attainable Targets:**

**Simultaneous Linear Equations:**

- Solve simultaneous equations involving two variables, by eliminating one of the variables.
- Express one of the variables in terms of the other, and to solve the simultaneous equations using the substitution method.
- Identify simultaneous equations as being solvable only when the number of equations is equal to the number of variables.
Graphs of linear equations in two unknowns

- Plotting the lines representing two linear equations on the same plane.
- Relation between the coefficients of pair of linear equations.
- Predict about the given system of linear equations.
- Graphical representation of pair of linear equations.
- Algebraic interpretation of Graphical representation of pair of linear equations.
- Nature of system of linear equations.
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</table>
| October | Volume and Surface Area | Students should be able to:  
• Identify and convert a metric unit of volume into another metric unit such as 1 m³ = 1 000 litres, 1 litre = 1 000 cm³, etc.  
• Draw the net of a cuboid.  
• State and use the formulae for finding the volume and surface area of cuboids.  
• State and use the formulae for finding the volume and total surface area of prisms and draw the nets of prisms.  
• State and use the formulae for finding the volume, curved surface area and total surface area of cylinders and to solve problems involving cylinders.  
• Solve problems involving hollow cylinders, and solids consisting of prisms, cylinders and cuboids and problems involving densities. | • Book – 1  
Pg # 191 – 214  
• Workbook – 1  
Pg # 75 – 79  
Links:  
www.mathworksheet4kids.com  
www.homeschoolmath.net  
www.khanacademy.org | • Group activity of making 3D shapes by using boxes and card sheets. |
<table>
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<tr>
<th>October</th>
<th>Students should be able to:</th>
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<tr>
<td>• Symmetry Addendum Book 1, Pg No.4-22</td>
<td>• Recognize line and rotational symmetry (including order of rotational symmetry) in two dimensions, and properties of triangles, quadrilaterals and circles directly related to their symmetries;</td>
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<td>• Recognize symmetry properties of the prism (including cylinder) and the pyramid (including cone);</td>
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<td>• Book – 1 Addendum Pg # 4 – 22</td>
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<tr>
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<td>Links:</td>
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<tr>
<td></td>
<td>• <a href="http://www.lerannext.com">www.lerannext.com</a></td>
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<td></td>
<td>• <a href="http://www.khanacademy.org">www.khanacademy.org</a></td>
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**Attainable Targets:**

**Volume and Surface Area:**
- Student must know the practical application of volume and surface area.
- Student must be able to differentiate between figures.
- Must memorize formulae and implement them in the correct places.

• Individual activity of making lines of symmetry of basic geometrical shapes on card sheet.
Symmetry

Must know the practical application of symmetry.

A shape has symmetry where it can be folded in half so that both halves match. The told line is the line of symmetry.

Many regular shapes have more than one line of symmetry:

- **SQUARE**: Four lines of symmetry
- **EQUILATERAL TRIANGLE**: Three lines of symmetry
- **CIRCLE**: Countless (Infinite lines of symmetry)
An upper case letter A has a line of symmetry but the letter G has no lines of symmetry.
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<tr>
<td>January</td>
<td>Percentage Book 1, Chap No.11 Pg No.249-266</td>
<td>Students should be able to: • Express a percentage as a decimal and vice versa. • Express a percentage as a fraction and vice versa. • Express one quantity as a percentage of another. • Calculate a quantity given its percentage. • Compare two quantities using percentage. • Compare quantities for percentages greater than 100%. • Increase and decrease a quantity by a given percentage using a ratio or an equation. • Solve problems involving discount, commission and GST. • Solve problems involving money and convert from one currency to another.</td>
<td>Book -1 Pg # 249 – 266 Workbook – 1 Pg # 92 – 96 Links: <a href="http://www.cnm.edu">www.cnm.edu</a> <a href="http://www.openlysolved.org">www.openlysolved.org</a> <a href="http://www.khanacademy.org">www.khanacademy.org</a></td>
<td>Group activity, students will make their own shop in which they give discount on some items and they will get profit/loss on the sold items.</td>
</tr>
</tbody>
</table>
### Students should be able to:

- use letters to express generalised numbers and express basic arithmetic processes algebraically, substitute numbers for words and letters in formulae;
- transform simple and more complicated formulae;
- construct equations from given situations.
- factorise expressions of the form \( ax + ay + bx + kby \ a \ x^2 - b \ y^2 \) \( a^2 + 2ab + b^2 \) \( ax^2 + bx + c \)
- Perform expansions of algebraic expressions using the rules above.
- Evaluate numerical expressions using the identities learnt earlier.
- Factorise algebraic expressions by picking out the common factor.
- Factorise expressions using the algebraic identities involving perfect squares and difference of squares learnt earlier.
- Evaluate numerical expressions using factorisation.
- Factorise quadratic expressions.

### Links:

- [www.mathsisfun.com](http://www.mathsisfun.com)
- [www.everythingmaths.com](http://www.everythingmaths.com)
- [www.khanacademy.org](http://www.khanacademy.org)

### Attainable Targets:

#### Percentages:

- Understand the meaning of per cent.
- Work out percentages of 100 and out of 100.
- Demonstrate the ability to calculate percent increases and decreases in real life situations.
Expansion and Factorisation of Algebraic Expressions:

➢ Student will be able to determine the factors of algebraic forms.
➢ Student will be able to determine through identities.

Factorisation (Math)

1. Bring out Common Factor
Example: \(2x - 4y + 10z\)
   \[= 2(x - 2y + 5z)\]

2. By Grouping
Example: \(2x^2 + 7x + 6\)
   \[= 2x^2 + 4x + 3x + 6\]
   \[= 2x(x + 2) + 3(x + 2)\]
   \[= (x + 2)(2x + 3)\]

3. By Cross Method
Example: \(2x^2 + 7x + 6\)
   \[= (2x + 3)(x + 2)\]

4. By Algebraic Rules
   i. \(a^2 + 2ab + b^2 = (a + b)^2\)
   ii. \(a^2 - 2ab + b^2 = (a - b)^2\)
   iii. \(a^2 - b^2 = (a - b)(a + b)\)
### FEBRUARY

**CHAPTER # 3 (Book 2)**  
Expansion and Factorisation of Algebraic Expressions (Cont)  
Pg No: 71 - 108

**CHAPTER # 6 (Book 2)**  
Pythagoras’ theorem  
Page numbers: 177 - 187

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</table>
| February | (Contd.) Expansion and Factorisation of Algebraic Expressions  
Book 2, Chap No.3  
Pg No.71-108 | Students should be able to:  
• Identify a right-angled triangle and its hypotenuse.  
• Define the Pythagoras’ theorem and its converse and use proper symbols to express the relationship.  
• Apply the Pythagoras’ theorem to find the unknown side of a right-angled triangle when the other two sides are given.  
• Solve word problems involving right-angled triangles using Pythagoras’ theorem.  
• apply Pythagoras Theorem to the calculation of a side  
• apply Pythagoras Theorem and the sine, cosine and tangent ratios for acute angles to the calculation of a side or of an angle of a right-angled triangle (angles will be quoted in, and answers required in, degrees and decimals of a degree to one decimal place); | • Book -2  
Pg # 71 – 108  
• Workbook – 2  
Pg # 28 – 33  
• Book - 2  
Pg # 177 -187  
• Workbook -2  
Pg # 59 – 70  
Links:  
• www.onlinemathlearning.com  
• www.khanacademy.org  
• www.math-only-math.com | One group will activate and present.
Attainable Targets:

**Pythagoras’ Theorem:**
- Identify and apply the Pythagorean Theorem to find the missing hypotenuse of a triangle.
- Identify and apply the Pythagorean Theorem to find the missing leg of a triangle
- Look for and regularity in repeated reasoning.

![Pythagoras Theorem Diagram]

**MARCH**

**Chap # 15 (Book 1)**
Angle Properties Of polygons,
Page No. 357-380

**CHAPTER # 13(Book 1):**
Statistics
Page No. 291-324

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<tr>
<td>March</td>
<td>• Angle Properties Of polygons</td>
<td></td>
<td>• Book -1 Pg # 357 – 380</td>
<td>• Grouped activity of making different polygons by using different color chart paper.</td>
</tr>
<tr>
<td></td>
<td>Book 1, Chap No. 15 Page No.357-380</td>
<td>• Students should be able to: • State the properties of a triangle such as (a) sum of interior angles = 180°, (b) exterior angle = sum of interior opposite angles, and use them to solve problems. • State and use the geometrical properties of (a) trapeziums, (b) parallelograms, (c) rectangles, (d) rhombuses, (e) squares and (f) kites, and use them to solve problems involving these figures. • State the sum of the interior angles of a convex polygon and the sum of its exterior angles and use them to solve problems involving angle properties of convex polygons. • collect, classify and tabulate statistical data; read, interpret and draw simple inferences from tables and statistical diagrams;</td>
<td>• Workbook – 1 Pg # 126 – 139</td>
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<tr>
<td></td>
<td>• Statistics</td>
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<td>• Book - 1 Pg # 291 -324</td>
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<td></td>
<td>Book 1, Chap No.13 Pg No.291-324</td>
<td></td>
<td>• Workbook -1 Pg # 105 – 115</td>
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<td>Links: <a href="http://www.mytestbook.com">www.mytestbook.com</a></td>
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Attainable Targets:

Angle Properties Of polygons:

- Compare and contrast the properties of regular and irregular polygons.
- Identify polygons as either regular or irregular polygons up to a decagon.

Statistics:

- Systematically collect, organize, and describe data
- Construct, read, and interpret tables charts, and graphs
- Make inferences and convincing arguments that are based on data analysis
- Develop an appreciation for statistical methods as powerful means for decision making
- The Pie Chart
- The Bar Graph
- The Statistical Map
- The Histogram
- Statistics in Practice
- The Frequency Polygon
- Times Series Charts
- Distortion in Graphs
Breadth of Study:

During the key stage, students should be taught the knowledge, skills and understanding through:
(a) activities that ensure they become familiar with, and confident using, standard procedures for the range of calculations appropriate to this level of study;
(b) solving familiar and unfamiliar problems in a range of numerical, algebraic and graphical contexts and in open-ended and closed form;
(c) using standard notations for decimals, fractions, percentages, ratio and indices;
(d) activities that show how algebra, as an extension of number using symbols, gives precise form to mathematical relationships and calculations;
(e) activities in which they progress from using definitions and short chains of reasoning to understanding and formulating proofs in algebra and geometry;
(f) a sequence of practical activities that address increasingly demanding statistical problems in which they draw inferences from data and consider the uses of statistics in society;

Assessment and Homework:

Students will be assessed by taking test of each and every chapter. Home Work shall be given on a daily basis.

Mathematical Notations:
The list which follows summarizes the notation used

Mathematical Symbols
≡ is equal to
≠ is not equal to
∥ is identical to or is congruent to
≈ is approximately equal to

Operations
\[ a + b \] a plus b
\[ a - b \] a minus b
\[ a \times b, \ ab, \ a.b \] a multiplied by b
\[ a \div b, \ a/b \] a divided by b

Resource List

Books:
Bostock, L, S Chandler, A Shepherd, E Smith ST (P) Mathematics Books 1A to 5A (Stanley Thornes)
Book 1A Book 2A
Book 1B Book 2B
Buckwell, Geoff Mastering Mathematics (Macmillan Education Ltd) 0 333 62049 6
Book 1
Book 2
Book 1
Book 2
Book 21eme or t
Cox, C J and D Bell Understanding Mathematics Books 1–5 (John Murray)
Book 1
Book 2
Websites:

www.nrich.com
www.hoddereducation.com
www.collinseducation.com
www.pearsonschoolsandfecolleges.co.uk
www.hoddereducation.com
www.lettsandlonsdale.com
www.counton.org
www.math.com
www.maths-help.co.uk
www.mathsnet.net