

**8C**

**Year 8 Maths ILA (Units 13/14)**

**Mathslinks 8C Book**

 **Unit 13 (Algebra) & Unit 14 (SSM)**

 Level 6/7 Level 6/7

**ONLY USE A CALCULATOR WHERE YOU SEE THIS SYMBOL ![C:\Users\cblaymire\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\C0A4LQYK\MC900389698[1].wmf]()**

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| **What is the purpose of this ILA?** |
| * To encourage independent learning by students outside the classroom.
* To develop a stronger understanding of algebra and shape, space and measure work at level 6/7.
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| **What is expected from you?** |
| * To complete your own work, to the best of your ability, with pride.
* To show clear methods; show **all** your working out not just the answer.
* Some students may struggle. If you find yourself “in the pit” you need to find a way out.
* The Investigation is an important part of the ILA and must be attempted, showing reasonable effort.
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| **Where can you get help?** |
| * Look at the 8C Maths Links book (units 13 and 14).
* Use the Maths ILA/homework Club after school on Tuesdays in S1.
* Use the Unity College VLE (KS3).
* Use the Learning Zone before or after school (8.00-8.35 Mon - Fri and 3.10-4.30 Mon - Thurs).
* Use MyMaths.co.uk and Sam Learning.
* Seek extra help at the Maths ILA Club. You are **expected** to attend to complete any parts you struggle with.
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| **Learning Objectives** |
| **Algebra**1. To be able to find an unknown in a formulae and change the subject of a formula.
2. To be able to solve linear equations involving fractions.
3. To be able to use trial-and-improvement to solve equations.
4. To be able to plot graphs of linear functions in the form ax + by = c.

**SSM**1. To be able to use a ruler and compasses to construct a perpendicular.
2. To be able to calculate the circumference and area of a circle.
3. To be able to calculate the surface area and volume of a prism.
4. To be able to use bearings to specify direction.
 | Level 7bLevel 7cLevel 6aLevel 7bLevel 6aLevel 6aLevel 7cLevel 6b |
| **Hints and Tips** |
| * Algebraic expressions follow the same conventions as arithmetic operations.
* Bearings are measured from north clockwise using three figures.
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| **Keywords** |
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| algebraic functions | circumference | solve |
| common denominators | surface area | bearing |
| trial and improvement | volume |  |
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| **Learning Objective 1. To be able to find an unknown in a formulae and change the subject of a formula. Level 7b** |

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| 1.a.b. | Doctors sometimes use this formula to calculate how much medicine to give a child:

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|  *c* is the correct amount for a child, in ml*c* =  *a*is the amount for an adult, in ml *y*is the age of the child, in years |

A child who is **4 years old** needs some medicine. The amount for an adult is **20 ml**. Use the formula to work out the correct amount for this child. Another child needs some medicine. The amount for an adult is **30 ml**. The correct amount for this child is **15 ml**. How old is this child?  | (1 mark)(1 mark) |
| 2.a.b. | Find the values of *a* and *b* when ***p* = 10**$$a=\frac{3p^{3}}{2}$$$$b=\frac{2p^{2}\left(p-3\right)}{7p}$$ | (2 marks) |
| 3.a.b.c. | Make x the subject of these formulae:m = 4(x + n)p = q(x – t)k(x – y) = f² | (3 marks) |
| 4.a.b. | The subject of the equation below is *p**p* = 2 ( *e* + *f* )Rearrange the equation to make *e* the subject.Rearrange the equation *r* *=* (*c – d*) to make *d* the subject. | (2 marks) |
| 5. | This is what a pupil wrote:Show that the pupil was **wrong** | (1 mark) |
| **Learning Objective 2. To be able to solve linear equations involving fractions. Level 7c** |

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| 6.a.b.c.d.e.f.g. | Solve these equations:$$4=\frac{20}{y}$$ $$\frac{a}{3}=\frac{a+4}{5}$$ $$\frac{b+6}{9}=\frac{b-2}{5}$$$$\frac{2p-1}{9}=\frac{p-3}{2}$$$$\frac{3m+1}{7}=\frac{5m-6}{4}$$$$\frac{3t-2}{5}=\frac{5t-8}{6}$$$$\frac{5y-1}{4}=\frac{7y-5}{5}$$ | (14 marks) |
| **Learning Objective 3. To be able to use trial-and-improvement to solve equations. Level 6a** |

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| 7.  | Use trial and improvement to complete the table to find a solution to the equation. Give your answer to 1 decimal place.*x3* – 2*x* = 90

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| ***x*** | ***x3* – 2*x*** | **Comment** |
| 4 | 56 | Too low |
| 5 | 115 | Too high |
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  Answer \_\_\_\_\_\_\_\_\_\_\_\_ | **C:\Users\cblaymire\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\C0A4LQYK\MC900389698[1].wmf**(4 marks) |

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| **Learning Objective 4. To plot graphs of linear functions in the form** **ax + by = c. Level 7b** |

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| 8a.b. | Complete the tables and plot the graphs of these implicit functions on the same set of axes: x + y = 5

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| x | 0 | 1 | 2 |
| y |  |  |  |

5x – y = 1

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| x | 0 | 1 | 2 |
| y |  |  |  |

Write the co-ordinate of the point of intersection of these functions. | (2 marks)(2 marks) |
| **Learning Objective 5. To be able to use a ruler and compasses to construct a perpendicular. Level 6a** |

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| 9. | Use compasses and a ruler to construct a perpendicular bisector from point P on the line AB. Leave all your construction lines.**A****B** •**P** | (3 marks) |
| **Learning Objective 6. To be able to calculate the circumference and area of a circle. Level 6a** |

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| 10.a.b.c. | Calculate the circumference and area of the following circles (don’t forget your units). Use π = 3.14 for all questions on this page.5 cm •Circumference \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Area \_\_\_\_\_\_\_\_\_\_\_\_\_\_8 m •Circumference \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Area \_\_\_\_\_\_\_\_\_\_\_\_\_\_25 mm •Circumference \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Area \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | (6 marks) |
| **Learning Objective 7. To be able to calculate the surface area and volume of a prism. Level 7c** |

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| 11.a.3 cm2 cmb.3 mm 11.5 mm3.5 mmc. | Calculate the surface area and volume of the following prisms (don’t forget your units). Drawings are not to scale.14 cm4 cm7 cmSurface area \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Volume \_\_\_\_\_\_\_\_\_\_\_\_\_\_ 3 m6 m4 mSurface area \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Volume \_\_\_\_\_\_\_\_\_\_\_\_\_\_Surface area \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Volume \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **C:\Users\cblaymire\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\C0A4LQYK\MC900389698[1].wmf**(6 marks) |

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| **Learning Objective 8. To be able to use bearings to specify direction. Level 6b** |

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| 12.Figstona.b. | The following map shows the positions of different towns from Middle town. NAltonGinby .MiddleBorthEggleCordyDillyName the places that are on the following bearings from Middle:279° \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 040° \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 294° \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 201° \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 141° \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Draw the following towns on the map at the bearings stated:Haddo at bearing 120°Inkor at bearing 175°Juppy at bearing 270° | (5 marks)(3 marks) |
| **Investigation** |

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| 1.2.b. | Construct an accurate equilateral triangle below with sides of 5 cm using a ruler and compasses. All your construction lines should be clearly visible.Construction rodsYou have 6 construction rods with a hole at each end, which enables them to be fixed together. When you measure the distance between the holes you find that: three have a 3cm gapthree have a 4cm gapone has a 5cm gap one has a 6cm gapand one has a 7cm gap between the holes. •• •x 3 e.g.  • • x 3 • • x 1•••• • x1 • • x1 Investigate how many different sized triangles you can make using these construction rods.(space for working out)Which combinations of construction rods do not make a triangle? Why? | (20 marks)(3 marks) |

**Year 8 ILA – Mathslinks Book 8C Units 13 & 14**

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| **Level** | **Learning Objective** | **Pupil Assessment** | **Teacher Assessment** |
| 7b | To be able to find an unknown in a formulae and change the subject of a formula. | ☹ 😐 ☺ | ☹ 😐 ☺ |
| 7c | To be able to solve linear equations involving fractions. | ☹ 😐 ☺ | ☹ 😐 ☺ |
| 6a | To be able to use trial-and-improvement to solve equations. | ☹ 😐 ☺ | ☹ 😐 ☺ |
| 7b | To be able to plot graphs of linear functions in the form ax + by = c. | ☹ 😐 ☺ | ☹ 😐 ☺ |
| 6a | To be able to use a ruler and compasses to construct a perpendicular. | ☹ 😐 ☺ | ☹ 😐 ☺ |
| 6a | To be able to calculate the circumference and area of a circle. | ☹ 😐 ☺ | ☹ 😐 ☺ |
| 7c | To be able to calculate the surface area and volume of a prism | ☹ 😐 ☺ | ☹ 😐 ☺ |
| 6b | To be able to use bearings to specify direction. | ☹ 😐 ☺ | ☹ 😐 ☺ |

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| **Parental Comment** |
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| **Teacher General Comment** |
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| **Teacher Investigation Comment** |
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