

**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. | | |
| **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. | | |
| **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. | | |
| **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 7b  Level 7c  Level 6a  Level 7b  Level 6a  Level 6a  Level 7c  Level 6b | |
| **Hints and Tips** | | |
| * Algebraic expressions follow the same conventions as arithmetic operations. * Bearings are measured from north clockwise using three figures. | | |
| **Keywords** | | |
| |  |  |  | | --- | --- | --- | | algebraic functions | circumference | solve | | common denominators | surface area | bearing | | trial and improvement | volume |  | |  |  |  | | | |
| **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:   |  | | --- | | *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** | (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: | (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   |  |  |  | | --- | --- | --- | | ***x*** | ***x3* – 2*x*** | **Comment** | | 4 | 56 | Too low | | 5 | 115 | Too high | |  |  |  | |  |  |  | |  |  |  | |  |  |  | |  |  |  | |  |  |  |     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   |  |  |  |  | | --- | --- | --- | --- | | x | 0 | 1 | 2 | | y |  |  |  |   5x – y = 1   |  |  |  |  | | --- | --- | --- | --- | | 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 cm  2 cm  b.  3 mm  11.5 mm  3.5 mm  c. | Calculate the surface area and volume of the following prisms (don’t forget your units). Drawings are not to scale.  14 cm  4 cm  7 cm  Surface area \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Volume \_\_\_\_\_\_\_\_\_\_\_\_\_\_  3 m  6 m  4 m  Surface 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.  Figston  a.  b. | The following map shows the positions of different towns from Middle town.  N  Alton  Ginby  .  Middle  Borth  Eggle  Cordy  Dilly  Name 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 rods  You 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 gap  three have a 4cm gap  one has a 5cm gap  one has a 6cm gap  and 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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