

A Complete Guide to ...

# Algebra

Utilising the objectives as written in  
**MATHEMATICS in the New Zealand CURRICULUM**  
for

## Level 1

This resource contains:

- ☑ Table of contents
- ☑ Teaching notes
- ☑ In class activity sheets involving
  - worked examples
  - basic skills
  - word problems
  - problem solving
  - group work
- ☑ Homework / Assessment activity sheets



These resources are supplied as **PHOTOCOPY MASTERS**

Author: A. W. Stark



A Complete Guide to ...

# Algebra

Utilising the objectives as written in

**MATHEMATICS in the New Zealand CURRICULUM**

**Level 1**

and linked to **BSM** activities

This resource contains:

- Table of contents
- Teaching notes
- In class activity sheets involving
  - worked examples
  - basic skills
  - word problems
  - problem solving
  - group work
- Homework / Assessment activity sheets
- Answers



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L1MA

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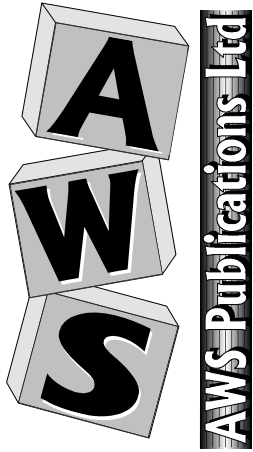
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## Note from the author:

This resource ...

# \*A Complete Guide to Algebra

is one of a series of **FIVE** resources written utilising the objectives as stated in

## ***Mathematics in the New Zealand Curriculum for Level 1.***

With my experiences as a specialist mathematics teacher, I enjoyed mathematics as a subject, but I am aware that not all teachers feel the same way about mathematics. It can be a difficult subject to teach, especially if you are unsure of the content or curriculum and if resources are limited.

This series of resources has been written with you in mind. I am sure you will find this resource easy to use and of benefit to you and your class.

### Resources in this series:

## A Complete Guide to Number

written utilising the objectives as stated in

***Mathematics in the New Zealand Curriculum for Level 1.***

Resource Code:  
**L1MN**

## A Complete Guide to Measurement

written utilising the objectives as stated in

***Mathematics in the New Zealand Curriculum for Level 1.***

Resource Code:  
**L1MM**

## A Complete Guide to Geometry

written utilising the objectives as stated in

***Mathematics in the New Zealand Curriculum for Level 1.***

Resource Code:  
**L1MG**

## \*A Complete Guide to Algebra

written utilising the objectives as stated in

***Mathematics in the New Zealand Curriculum for Level 1.***

Resource Code:  
**L1MA**

## A Complete Guide to Statistics

written utilising the objectives as stated in

***Mathematics in the New Zealand Curriculum for Level 1.***

Resource Code:  
**L1MS**

For more information about these and other resources, please contact ...



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### Acknowledgement:

I would like to thank the staff and pupils of **Mairehau Primary School, Christchurch** for their assistance in making these resources possible.

**This resource has been divided into SEVEN sections as listed below.**

Although there are no page numbers, the sections follow in sequential order as listed.

**Note:** 'In-class' Worksheets Masters are lesson by lesson worksheets that can be photocopied. Although stated on the cover that answers are provided, due to the nature of these worksheets, answers are considered unnecessary.

**Homework / Assessment Worksheets Masters** can be used as homework to reinforce work covered in class or they can be used for pupil assessment.

Section	
<b>1</b>	<b>List of Algebra Objectives: Table of 'In-class' Worksheets / Objectives covered</b>
<b>2</b>	<b>Table of Contents: 'In-class' Worksheets / Links to BSM activities</b>
<b>3</b>	<b>'In-class' Worksheets Masters</b>
<b>4</b>	<b>Teaching Notes</b>
<b>5</b>	<b>Table of Contents: Homework / Assessment Worksheets</b>
<b>6</b>	<b>Homework / Assessment Worksheets Masters</b>
<b>7</b>	<b>Worksheet tracking sheets for teachers to record pupil names / worksheets covered</b>

# 1

# Algebra

The following are the objectives for **Algebra, Level 1**, as written in the **MATHEMATICS** in the *New Zealand Curriculum* document, first published 1992. [REFER PAGE 130]

## Exploring patterns and relationships

Within a range of meaningful contexts, students should be able to:

- **A1** make and describe repeating and sequential patterns;
- **A2** continue a repeating and sequential pattern;
- **A3** illustrate and talk about relationships.

## Exploring equations and expressions

Within a range of meaningful contexts, students should be able to:

- **A4** write number sentences, using =, from story contexts.

At the top of each 'In-class' worksheet and **Homework / Assessment worksheet**, the Algebra objective(s) being covered has been indicated. *EXAMPLE:* **A1** means objective 1, **A2** means objective 2, etc.



The **Mathematical Processes Skills: Problem Solving,**

**Developing Logic & Reasoning,**  
**Communicating Mathematical Ideas,**

are learned and assessed within the context of the more specific knowledge and skills of number, measurement, geometry, algebra and statistics. The following are the **Mathematical Processes Objectives** for **Level 1**.

**Problem Solving Achievement Objectives** [Refer page 24]

- **MP1** pose questions for mathematical exploration;
- **MP3** devise and use problem-solving strategies to explore situations mathematically;
- **MP6** use equipment appropriately when exploring mathematical ideas.

**Developing Logic and Reasoning Achievement Objectives** [Refer page 26]

- **MP7** classify objects;
- **MP9** interpret information and results in context;
- **MP14** use words and symbols to describe and continue patterns.

**Communicating Mathematical Ideas Achievement Objectives** [Refer page 28]

- **MP16** devise and follow a set of instructions to carry out a mathematical activity;
- **MP17** record and talk about the results of mathematical exploration.

**Note:**

The codes **MP1**, **MP2**, etc. have been created by numbering the **Mathematical Processes Achievement Objectives** in order as listed in the **MATHEMATICS** in the *New Zealand Curriculum* document. The numbering gaps occur as not all objectives are covered at **Level 1**. [REFER TO PAGES 23 - 29 OF THE CURRICULUM DOCUMENT]

**'In-class' Algebra Worksheets**  
**Table of Worksheet Number / Objectives Covered**

See the opposite page for details of each objective.

Worksheet Number	Algebra Objectives				Mathematical Processes Objectives							
	A 1	A 2	A 3	A 4	MP 1	MP 3	MP 6	MP 7	MP 9	MP 14	MP 16	MP 17
1	×	×				×			×			
2	×	×				×			×	×		×
3	×	×				×			×	×		×
4	×	×				×			×	×		×
5	×	×				×			×	×		×
6	×	×				×			×	×		×
7	×	×				×			×	×		×
8		×				×			×	×		×
9			×			×			×		×	
10			×			×			×		×	
11			×			×			×		×	
12			×			×			×		×	
13			×			×			×		×	
14			×			×			×		×	
15				×		×			×			
16				×		×			×			
17				×		×			×			
18				×		×			×			
19				×		×			×			

## Table of Contents for the 'In-class' Worksheet Masters for Level 1 Algebra, *plus* links BSM core activities.

Worksheet Number	Topic	Algebra Objective(s)	BSM Cycle	Core Activities
<b>1</b>	Repeating picture patterns	A1 / A2	4.3 5.3 6.3 8.3	11, 12 9, 11 6 10
<b>2</b>	Repeating shape patterns	A1 / A2	4.3 5.3 6.3 8.3	11, 12 9, 11 6 10
<b>3</b>	Letter and number repeating patterns	A1 / A2	4.3 5.3 6.3 8.3	11, 12 9, 11 6 10
<b>4</b>	Number patterns created by adding 1 or 2	A1 / A2	7.3	6
<b>5</b>	Number patterns created by adding 5 or 10	A1 / A2	7.3	6
<b>6</b>	Number patterns created by adding 3 or 4	A1 / A2	7.3	6
<b>7</b>	Number patterns created by subtracting	A1 / A2	7.3	6
<b>8</b>	Creating shape patterns	A1 / A2	7.3	6
<b>9</b>	Understanding relationship diagrams	A3	5.1 6.1 7.1	1, 8, 9 1 54
<b>10</b>	Creating relationship diagrams	A3	5.1 6.1 7.1	1, 8, 9 1 54

Worksheet Number	Topic	Algebra Objective(s)	BSM Cycle	Core Activities
11	Using number rules to find answers	A3	5.1 6.1 7.1	1, 8, 9 1 54
12	Creating and using number rules	A3		
13	Finding number rules	A3		
14	Making up your own number rules	A3		
15	Writing number sentences or equations	A4		
16	Completing number sentences or equations	A4	8.1	5, 7
17	Understanding 'is less than' and 'is greater than' symbols	A4	7.3 8.3 9.1 10.3	3 3, 5 11 7
18	Using <, > and = symbols	A4	7.3 8.3 9.1 10.3	3 3, 5 11 7
19	Writing equations from word problems	A4		
<b>Teaching Notes</b>				





Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

## Repeating picture patterns:



### Task 1

Look at these picture patterns below.

Talk about each pattern and draw the next picture in the space.

1. 

2. 

3. 

4. 

5. 

### Task 2

Use plastic animals, or animal stamps and an ink pad, to make up 5 of your own repeating patterns.



Have a classmate work out the next animal for each pattern.



# Algebra

L1MA

# 2

A1 / A2

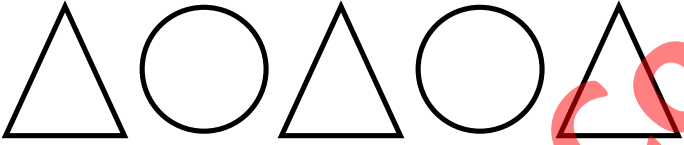
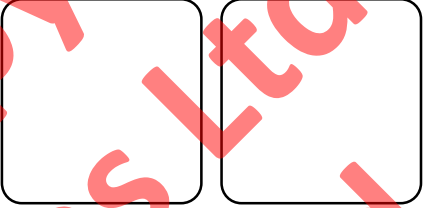
Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_


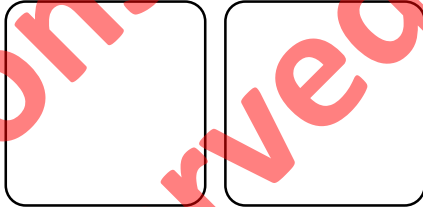
## Repeating shape patterns:

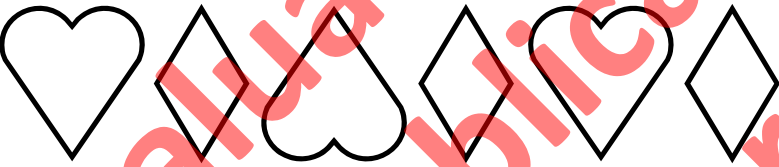
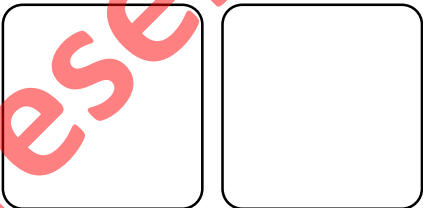
### Task 3


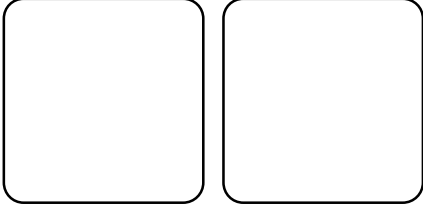
Look at these shape patterns below.


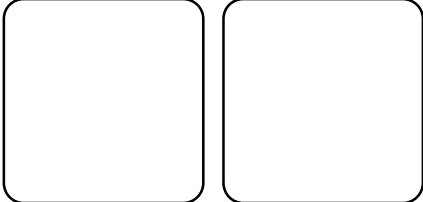
Talk about each pattern and draw the next 2 shapes in the spaces.

1.  

2.  

3.  

4.  

5.  

### Task 4

Use plastic shapes or coloured blocks to make up 5 of your own repeating patterns.



Have a classmate work out the next 2 shapes for each pattern.



# Algebra

L1MA

3

A1 / A2

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

Letter and number repeating patterns:

## Task 5



Talk about each pattern below, then work out the next 3 letters or numbers for each pattern.

1. **g, h, g, h, g, h, g, h,**
2. **x, y, z, x, y, z, x, y,**
3. **a, b, c, a, b, c, a, b,**
4. **e, f, f, e, e, f, f, e, e,**
5. **a, e, i, o, u, a, e, i, o,**
6. **1, 2, 1, 2, 1, 2, 1, 2,**
7. **5, 10, 5, 10, 5, 10,**
8. **1, 3, 5, 1, 3, 5, 1, 3,**
9. **2, 4, 6, 8, 2, 4, 6, 8,**

## Task 6

Use letters or numbers to make up 5 of your own repeating patterns.

Have a classmate work out the next 3 letters or numbers for each pattern.





# Algebra

L1MA

4

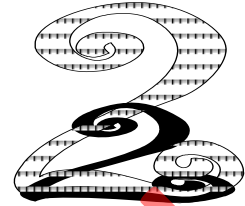
A1 / A3

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

## Number patterns created by adding 1 or 2:

Jodie made a number pattern by **adding 1** to each number.

*Example:* 1, 2, 3, 4, 5, 6, ... The next 3 numbers would be 7, 8 and 9. This pattern could go on for ever.



### Task 7

Look at each pattern below, then **work out** the **3** missing numbers that would go in each space. Remember, these patterns can go on forever.

1. 1, 2, 3, , 5, 6, , 8, 9,
2. 1, 3, , 7, 9, 11, , 15,
3. 2, 4, 6, , 10, 12, , 16,
4. 7, 8, , 10, 11, , 13,
5. 10, 12, 14, , , 20,
6. , 9, 11, 13, , 17, 19,
7. 4, , , 10, 12, , 16
8. 15, 17, 19, , , 25,

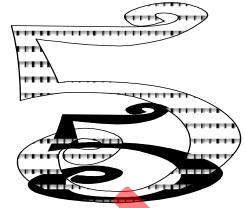
Talk about each pattern above.

9. What number is added to each number to make these patterns?
10. Work out the next 3 numbers for each pattern.





Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

**Number patterns created by adding 5 or 10:**Brad made a number pattern by **adding 5** to each number.*Example:* 5, 10, 15, 20, 25, ... The next 3 numbers would be 30, 35 and 40. This pattern could go on for ever.**Task 8**Look at each pattern below, then **work out** the **3** missing numbers that would go in each space. Remember, these patterns can go on forever.

1. 5, 10, 15, , 25, , 35,
2. 10, , 30, 40, , 60,
3. 1, 6, , 16, 21, , 31,
4. 4, 9, 14, , 24, , 34,
5. 12, 22, 32, , , 62,
6. , 16, 26, 36, , 56,
7. 7, , , 22, 27, , 37
8. 3, 13, 23, , , 53, 63

Talk about each pattern above.

9. What number is added to each number to make these patterns?

10. Work out the next 3 numbers for each pattern.





# Algebra

L1MA

6

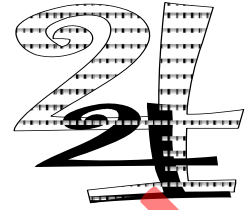
A1 / A2

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

## Number patterns created by adding 3 or 4:

Jodie made a number pattern by **adding 3** to each number.

*Example:* 3, 6, 9, 12, 15, ... The next 3 numbers would be 18, 21 and 24. This pattern could go on for ever.



### Task 9

Look at each pattern below, then **work out** the **3** missing numbers that would go in each space. Remember, these patterns can go on forever.

1. 3, 6, 9, , 15, 18, , 24,
2. 4, 8, , 16, 20, 24, ,
3. 5, 8, 11, , 17, , 23,
4. 1, 5, , 13, 17, , 25,
5. 4, 7, 10, , , 19, 22
6. , 13, 17, 21, , 29,
7. 2, , , 8, 10, , 14
8. 15, 18, 21, , , 30,

Talk about each pattern above.

9. What number is added to each number to make these patterns?
10. Work out the next 3 numbers for each pattern.





Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

**Number patterns created by subtracting:**

Andrew made a number pattern by **subtracting 2** from each number. *Example: 20, 18, 16, ...* The next 3 numbers would be 14, 12 and 10.

**Task 10**

Look at each pattern below, then **work out** the **3** missing numbers that would go in each space.

1. **18, 17, 16,** , **14,** ,
2. **19,** , **15, 13,** , **9,**
3. **100,** , **80, 70,** , **50,**
4. **60, 55,** , **45, 40,** , **30,**
5. **36, 33, 30,** , , **21,**
6. , **44, 40, 36,** , **28,**
7. **33,** , , **27, 25,** , **21**
8. **32, 29, 26,** , , **17, 14**

Talk about each pattern above.

9. What number has been subtracted from each number to make these patterns?
10. **Work out the next 3 numbers** for each pattern.





# Algebra

L1MA

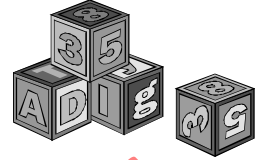
# 8

A2

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

## Creating shape patterns:

### Task 11



Look at each shape pattern below, then **draw** what you think the next diagram would look like.

	Diagram 1	Diagram 2	Diagram 3	Diagram 4
1.				
2.				
3.				
4.				
5.				
6.				

### Task 12

Use some blocks to **create 3 different patterns** of your own.

Have a classmate build the next shape in each of your patterns.





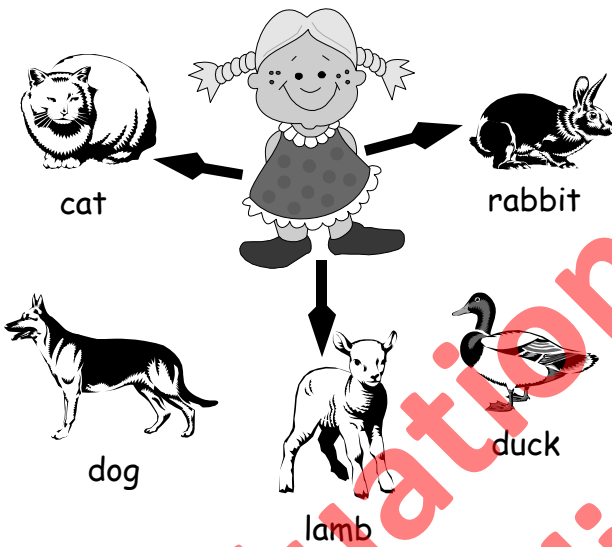


Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

## Understanding relationship diagrams:

### Task 13

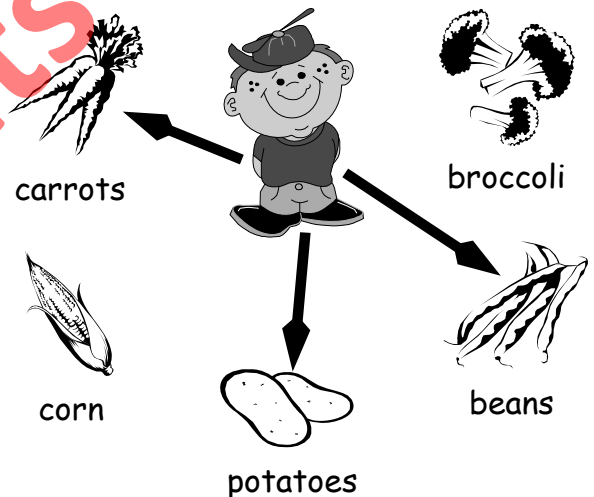
In this diagram below, the arrows show the 'relationship' between Rebecca and some animals. The means 'Rebecca likes'.



1. Does Rebecca like cats? .....
2. What other animals does Rebecca like?  
.....
3. Does Rebecca like dogs? .....
4. What other animal does Rebecca not like?  
.....

In this diagram below, the arrows show the 'relationship' between James and some food items. The means 'James likes'.

5. Does James like carrots? .....
6. What other food does James like?  
.....
7. Does James like corn? .....
8. What other food does James not like?  
.....



### Task 14

Draw your own 'relationship' diagram for ...  
'the animals you like' and 'the food you like'.

The means 'I like'.





# Algebra

L1MA

10

A3


Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

## Creating relationship diagrams:

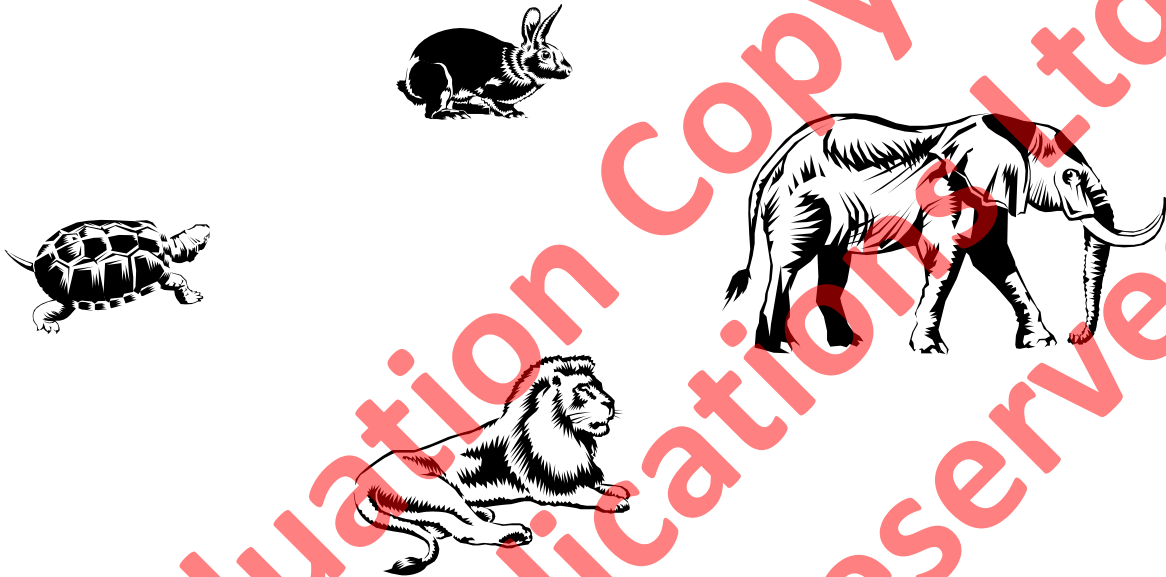


### Task 15

Add the arrows to this relationship diagram.

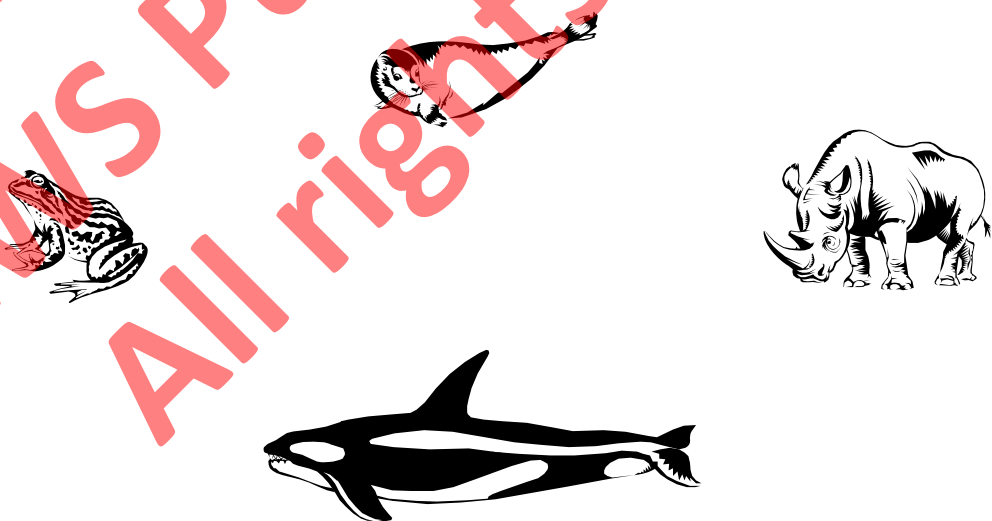
The  means 'can run faster than'.

1.



Add the arrows to this relationship diagram.

The  means 'is heavier than'.



### Task 16

Make up 3 relationship diagrams of your own.

Example: 'is older than', 'is younger than',  
'is taller than', 'is lighter than'.





# Algebra

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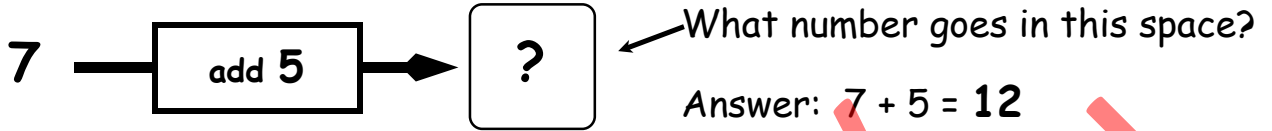
11

A3

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

## Using number rules to find answers:

Look at the rule in the box.

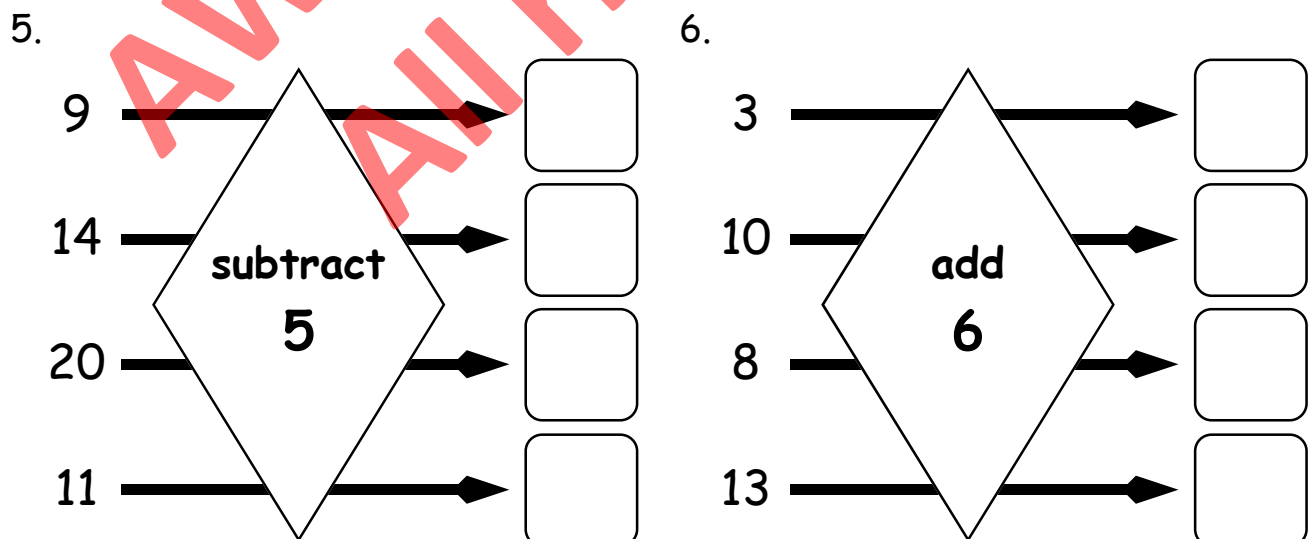
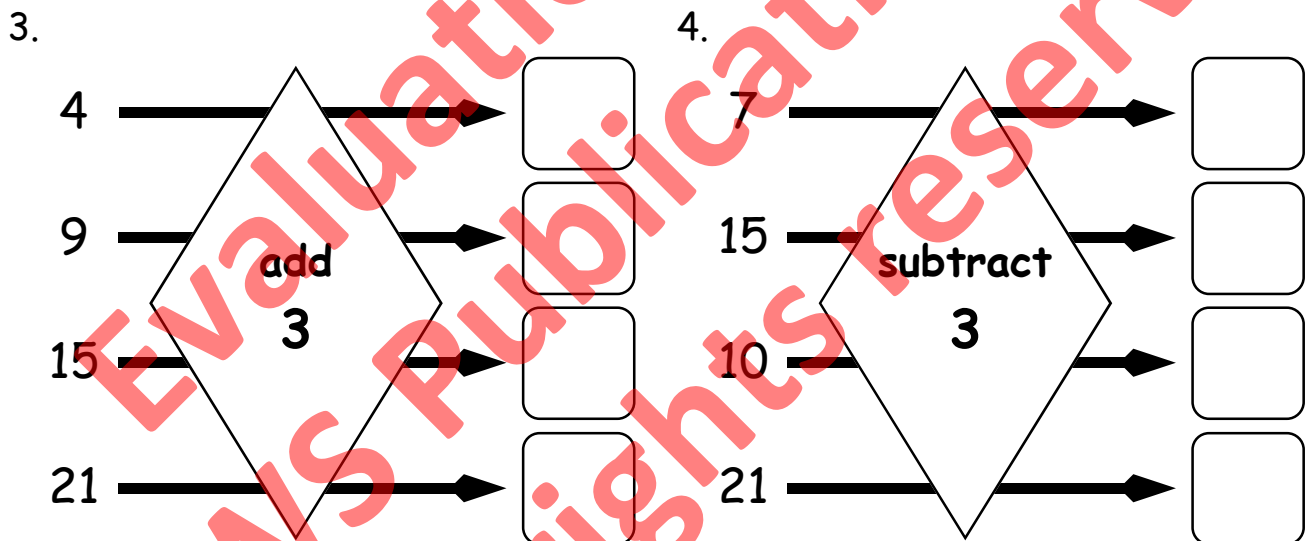


### Task 17

Work out the missing number that would go in the space.



Use these rules in each diamond to work out the missing numbers.





Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

## Creating and using number rules:

### Task 18

Write a number in each square. Make up a rule and write this in the diamond. Have a classmate work out what numbers go in the circles.

1.

2.

3.

4.

5.

6.



# Algebra

L1MA

13

A3

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

## Finding number rules:

Look at these two numbers. What rule would go in the space?



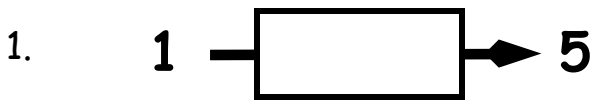
Answer:  $7 + ? = 11$

7 add 4 = 11



## Task 19

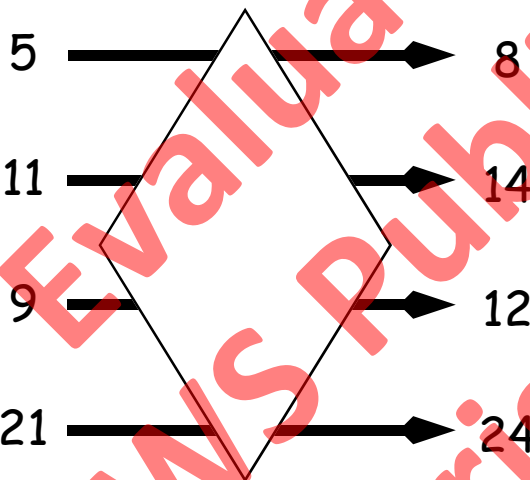
Work out the rule that would go in the space.



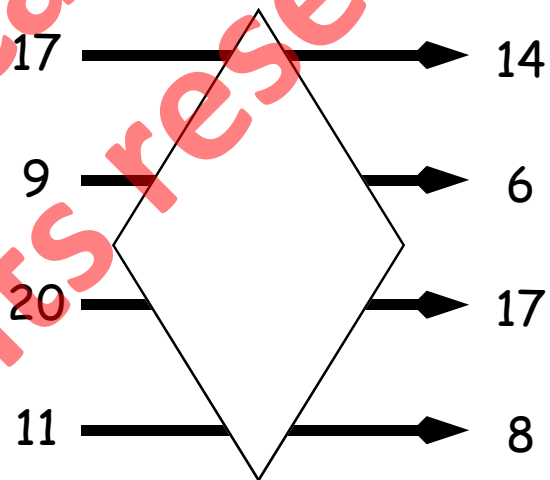
Look at the numbers at either end of each arrow.

Work out and write the rule that would go in each diamond.

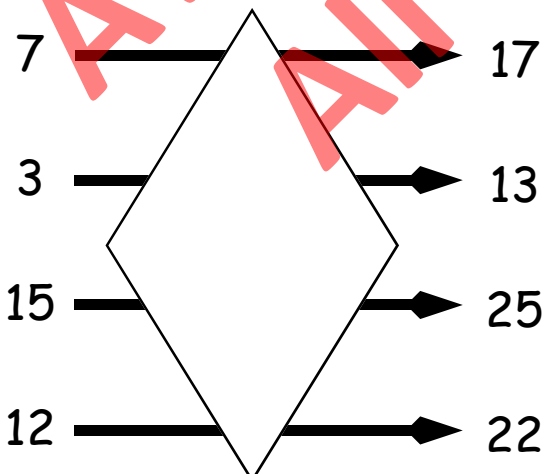
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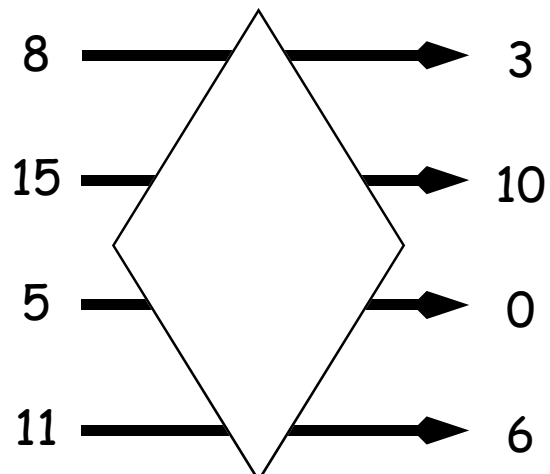
4.



5.



6.

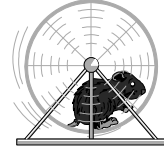




Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

## Making up your own number rules:

### Task 20



Make up a rule but do not write this in the diamond.

Use your rule to work out the numbers that would go in the circles.

Write the numbers in the circles.

Have a classmate work out your rules.

1. 

4
8
5
12

 → → 

○
○
○
○

2. 

10
15
11
8

 → → 

○
○
○
○

3. 

7
15
6
11

 → → 

○
○
○
○

4. 

6
14
9
19

 → → 

○
○
○
○

5. 

14
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 → → 

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 → → 

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○

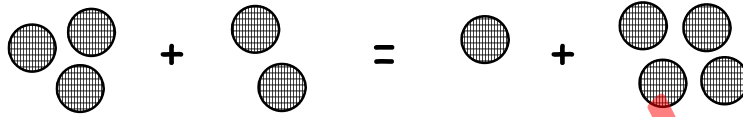


Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

### Writing number sentences or equations:

A number sentence (an equation) must have an 'equals' sign.

Example:



The number sentence or equation would be  $3 + 2 = 1 + 4$ .

### Task 21

Draw in the shapes that are missing from each space.

Write a number sentence or equation below the shapes.

1. +  =

2.  + =

..... + ..... = .....

3.  +

4. +  =

..... + ..... = .....

5. +  = +

6. + =  +

..... + ..... = ..... + .....

7. + = +

8.  + = +

..... + ..... = ..... + .....

9. +  = +

10. + = +

..... + ..... = ..... + .....



# Algebra

L1MA

**16**

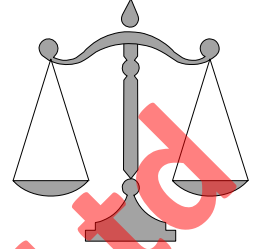
A4

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

## Completing number sentences or equations:

Find the missing number that would go in the space for this equation.

Example:  $6 + 3 = \square + 2$

The number missing is 7. ( $6 + 3 = 9$  and  $7 + 2 = 9$ )

### Task 22

Write in the missing numbers that would go in each space.

1.  $1 + \square = 5$

2.  $\square + 4 = 7$

3.  $2 + \square = 6$

4.  $\square + 7 = 9$

5.  $1 + 5 = \square + 3$

6.  $2 + \square = 3 + 4$

7.  $\square + 6 = 5 + 3$

8.  $9 + 1 = 4 + \square$

9.  $5 + 5 = \square + 7$

10.  $6 + \square = 7 + 4$

11.  $\square + 6 = 8 + 3$

12.  $7 + 5 = 4 + \square$

13.  $9 + 5 = \square + 7$

14.  $2 + \square = 8 + 5$

15.  $\square + 0 = 6 + 9$

16.  $7 + 8 = 5 + \square$

17.  $7 + 9 = \square + 10$

18.  $9 + \square = 6 + 11$





# Algebra

L1MA

17

A4

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

## Understanding 'is less than' and 'is greater than' symbols:

This symbol  $<$  means 'is less than'.

Example:







This symbol  $>$  means 'is greater than'.





Example:











### Task 23





Draw a 'is less than' or a 'is greater than' or a 'is equal to' symbol ( $<$ ,  $>$  and  $=$ ) in the spaces between these pairs of pictures.





1.    2.   

3.    4.   

5.    6.   

7.    8.   

9.    10.   

11.    12.   



Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

**Using <, > and = symbols:****Task 24**

Draw a 'is less than' or a 'is greater than' or a 'is equal to' symbol (<, > and =) in the spaces between these numbers.

1.  $1 + 5$    $3 + 4$       2.  $2 + 7$    $6 + 3$
3.  $6 + 2$    $4 + 3$       4.  $4 + 5$    $1 + 7$
5.  $5 + 5$    $3 + 7$       6.  $6 + 5$    $8 + 4$
7.  $7 + 4$    $6 + 6$       8.  $8 + 5$    $6 + 4$
9.  $8 + 6$    $7 + 7$       10.  $9 + 3$    $10 + 5$
11.  $9 + 5$    $7 + 6$       12.  $7 + 6$    $3 + 10$
13.  $8 + 8$    $6 + 9$       14.  $6 + 8$    $9 + 6$
15.  $7 + 7$    $5 + 10$       16.  $7 + 9$    $8 + 8$
17.  $5 + 9$    $8 + 6$       18.  $8 + 7$    $10 + 5$
19.  $9 + 9$    $6 + 10$       20.  $8 + 9$    $7 + 13$
21.  $7 + 9$    $12 + 4$       22.  $9 + 9$    $14 + 5$



Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

**Writing equations from word problems:***Example:*

Sam has three books and buys four more.

How many books does he have?

Answer:  $3 + 4 = 7$  is the equation.

Sam has 7 books.

**Task 25**Read each question, **write** an equation and **work out** the answer.

1. Jane has five books and buys three more.

How many books does she have?

..... + ..... = .....

2. Ben has ten lollies and eats seven.

How many lollies does he have left?

..... - ..... = .....



3. John has twelve toys but loses five.

How many toys does he have left?

..... - ..... = .....



4. Lucy has nine dolls and is given three more for her birthday. How many dolls does she now have?

..... + ..... = .....



5. Jason has a ten dollar and a five dollar note.

How much money does he have?

..... + ..... = .....



6. Lucy has fifteen dollars and spends eight dollars.

How much money does she have left?

..... - ..... = .....

**Task 26**

Make up 6 word questions as above.

Have a classmate **write** a **number sentence** for each question and work out each answer.

# 'In-class' Worksheet

## Teaching Notes

### How to use this section:

Teaching notes are enclosed in a box with a 'push-pin' at the top left corner. The teaching notes have been included to provide assistance and background information about each topic or unit of work.

### Note:

Although stated on the cover that answers have been included, because of the nature of the worksheets for Level 1 Algebra, **only selected answers are listed**. The cover for this resource is also used for the Level 2 series of Mathematics where answers are provided.

### Introduction:

The topic of **Algebra** is concerned with making and describing repeating and sequential patterns. By learning to continue these patterns, pupils will develop their problem solving skills. Simple diagrams are used to illustrate simple relationships involving animals, objects, people or numbers. The ability to create and solve equations or 'number sentences' is explored, plus the use of other mathematical symbols, that is, 'is less than' and 'is greater than'. Through the use of word problems, pupils further enhance their problem solving skills.

The '**In-class**' activity sheets have been designed to complement and build upon the concepts introduced through the **BSM system**. Most of these activity sheets have been written in such a way that it will allow pupils to work independently to complete the tasks set, with **minimal input from the teacher** once the pupils are clear as to the requirements of the task. The 'In-class' activity sheets for Level 1 are to be written on by the pupils, unlike the similar activity sheets for Levels 2, 3 & 4.



### Worksheets 1 to 3

#### Repeating picture patterns:

#### Repeating shape patterns:

#### Letter and number repeating patterns:

The first three worksheets involve repeating patterns. A repeating pattern involves a group of pictures or shapes being repeated in the same order, over and over again.

*Example:* R, L, R, L, R, L, etc. or 1, 2, 3, 1, 2, 3, 1, 2, 3, etc.

In **Task 1** pupils are to study repeating animal picture patterns and determine which picture will appear next. The patterns include repeating patterns of 2 and 4 different animal pictures, the same animal picture changing size or the same animal picture being reflected.

In **Task 2**, pupils are to use plastic animals, or animal stamps and an ink pad, to create their own repeating patterns. Classmates are to work out the next animal in the pattern.

In **Task 3**, pupils are to study repeating shape patterns and determine which two shapes will appear next. Similar patterns as in task 1 also appear in this task.

In **Task 4**, pupils are to use plastic shapes or blocks to create their own repeating patterns. Classmates are to work out the next two shapes in the pattern.

In **Task 5** pupils are to study repeating patterns, made from letters or numbers. Pupils are to work out the next three letters or numbers in each pattern.

In **Task 6**, pupils are to create 5 of their own letter or number repeating patterns. Classmates are to determine the next three letters or numbers for each pattern.

## Worksheets 4 to 8

**Number patterns created by adding 1 or 2:**  
**Number patterns created by adding 5 or 10:**  
**Number patterns created by adding 3 or 4:**  
**Number patterns created by subtracting:**  
**Creating shape patterns:**

The next four worksheets involve sequential patterns. In these sequential patterns, the patterns change by a constant number being added or subtracted, such as adding 2, or subtracting 3.

*Example:* Odd numbers go up in 2's. 1, 3, 5, 7, etc.

In **Task 7** pupils are to study sequential number patterns created by adding 1 or 2. There are missing numbers in each pattern that pupils are to work out. Having talked about how each sequential pattern has been created, pupils are to work out the next three numbers.

In **Task 8**, pupils are to study sequential number patterns created by adding 5 or 10. There are missing numbers in each pattern that pupils are to work out. Having talked about how each sequential pattern has been created, pupils are to work out the next three numbers.

In **Task 9**, pupils are to study sequential number patterns created by adding 3 or 4. There are missing numbers in each pattern that pupils are to work out. Having talked about how each sequential pattern has been created, pupils are to work out the next three numbers.

In **Task 10**, pupils are to study sequential number patterns created by subtracting either 1, 2, 3, 4, 5 or 10. There are missing numbers in each pattern that pupils are to work out. Having talked about how each sequential pattern has been created, pupils are to work out the next three numbers.

In **Task 11**, pupils are to study sequential shape patterns created by adding or subtracting a drawing of a 2D shape. Pupils are required to draw the next diagram in the sequence.

In **Task 12**, pupils are to create their own sequential shape / block patterns and have a classmate work out the next shape / block pattern in the sequence.

## Worksheets 9 & 10

**Understanding relationship diagrams:**  
**Creating relationship diagrams:**

In **Task 13** pupils are to look at 'relationship' diagrams. The arrow pointing between pictures within the diagram indicates the relationship, such as 'is taller than' etc. Pupils are to answer questions based on the information contained within the relationship diagram.

In **Task 14**, pupils are to draw two relationship diagrams as suggested.

In **Task 15**, pupils are given the relationship 'rule' but the arrows between pictures have not been added to the diagram. Pupils draw these arrows, as they work out the relationship between the pictures.

In **Task 16**, pupils are to create their own relationship diagrams, using everyday situations. Some examples have been suggested but drawing a family tree may be one such relationship diagram they might like to draw.

## Worksheets 11 to 14

**Using number rules to find answers:**  
**Creating and using number rules:**  
**Finding number rules:**  
**Making up your own number rules:**

In **Task 17** pupils are to work out number answers given a rule. For each pair of numbers indicated by the arrow, the relationship between these numbers will always be the same for a given rule.

*Example:* If the rule was 'add 10' then, 20, 30 → 150, 160 → 1120, 1130, all fit this rule or relationship.

In **Task 18** pupils are given a master sheet of diagrams, on which pupils are to write numbers in the squares, create a rule which they write in the diamond shape and have a classmate try to work out the answers which they write in the circles.

In **Task 19**, pupils are to work out the rule that was used to create a pair of numbers. Within the same group of number pairs, the rule must work for each pair of numbers. Encourage pupils to check that the rule does work for all number pairs and not just accept their rule, if it works for the first pair.

In **Task 20**, pupils are to create a rule, but do not write it on the sheet. Pupils are to use their rule to work out the second number, which they write on the sheet in the circles. Classmates are to look at the pairs of numbers to see if they can work out the rule used to create them.

## Worksheets 15 to 19

**Writing number sentences or equations:**

**Completing number sentences or equations:**

**Understanding 'is less than' and 'is more than' symbols:**

**Using <, > and = symbols:**

**Writing equations from word problems:**

In **Task 21** pupils are to draw the missing shapes to complete simple number sentences or equations. Having completed the diagrams, pupils are to write the equations under the diagrams. Ask pupils questions such as "What do you have to add to 7 to so that you have 11?", or the question can be turned around and thought of as a subtraction problem. That is, "11 subtract what number is 7?"

In **Task 22**, pupils are to work out the missing numbers that would go in the spaces. An equation can be thought of as a set of balancing scales, whereby both sides of the equals sign must be the same.

In **Task 23**, pupils are to draw in one of the symbols for 'is less than', 'is greater than' or 'is equal to' between pairs of diagrams.

In **Task 24**, pupils are to work out simple number problems each side of the space. Having worked out the answers, pupils are to draw in one of the symbols, <, > or =, inside this space.

In **Task 25**, pupils are to read some word problems, write simple equations and work out the answers.

In **Task 26**, pupils are to make up their own word problems and have a classmate try to write an equation for the information in the question and then work out the answer. If they cannot write the question out, this can be done orally.

*Example:* "If I have three soccer balls and five tennis balls, how many balls do I have altogether?" asked James. From this information, a classmate would write,  $3 + 5 = 8$  balls.

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## Table of Contents for the Homework / Assessment Worksheet Masters for Algebra, Level 1

Worksheet Number	Topic	Algebra Objective(s)
<b>1</b>	Repeating shape patterns / Repeating letter patterns / Repeating number patterns	A1 / A2
<b>2</b>	Number pattern sequences / Shape pattern sequences	A1 / A2
<b>3</b>	Relationship diagrams / Creating relationship diagrams	A3
<b>4</b>	Using number rules / Finding number rules	A3
<b>5</b>	Writing number sentences (equations) / Completing number sentences (equations)	A4
<b>6</b>	Using $<$ , $>$ and $=$ symbols / Word problems	A4





# Algebra

L1MA



A1 / A2

## Homework / Assessment Worksheet

Name: \_\_\_\_\_

Class: \_\_\_\_\_

Complete by: \_\_\_\_\_

### A: 10 Quick Questions



1.  $1 + 9 =$  .....

2.  $5 + 5 =$  .....

3.  $10 - 7 =$  .....

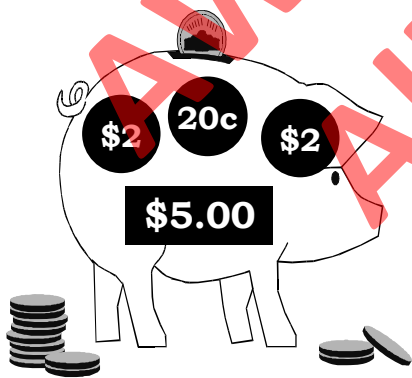
4.  $10 - 2 =$  .....

5.	4	6.	3
	+ 6		+ 7
<hr/>		<hr/>	

7.	10	8.	10
	- 9		- 4
<hr/>		<hr/>	

9. Draw a triangle.

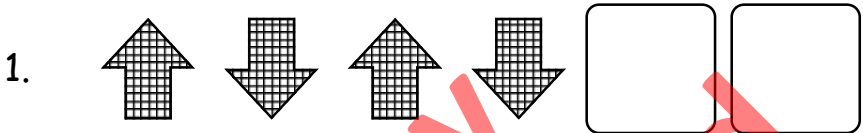
10. Add these coins and notes.



.....

### B: Repeating shape patterns

Draw the next 2 shapes in each pattern



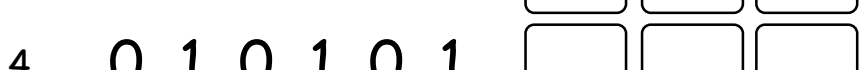
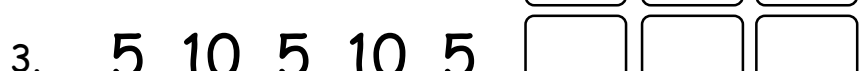
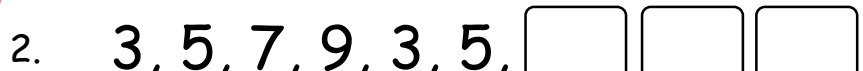
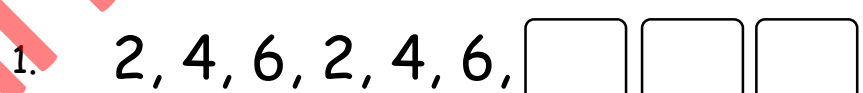
### C: Repeating letter patterns

Write the next 2 letters in these patterns.



### D: Repeating number patterns

Write the next 3 numbers in these patterns.



Comments: .....

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# Algebra

L1MA

# 2

A1 / A2

## Homework / Assessment Worksheet

Name: \_\_\_\_\_

Class: \_\_\_\_\_

Complete by: \_\_\_\_\_

### A: 10 Quick Questions



1.  $7 + 4 =$  .....

2.  $3 + 8 =$  .....

3.  $11 - 6 =$  .....

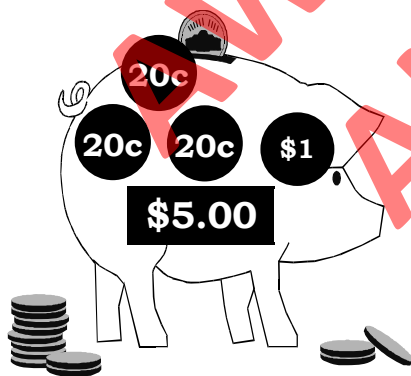
4.  $11 - 10 =$  .....

5. $\begin{array}{r} 9 \\ + 2 \\ \hline \end{array}$	6. $\begin{array}{r} 5 \\ + 6 \\ \hline \end{array}$
--	--

7. $\begin{array}{r} 11 \\ - 7 \\ \hline \end{array}$	8. $\begin{array}{r} 11 \\ - 2 \\ \hline \end{array}$
---	---

9. Draw a circle.

10. Add these coins and notes.



.....

### B: Number pattern sequences

Work out the 3 missing numbers that would go in the spaces.

1. 1, 3, 5, , 9, , 13,

2. 2, 4, 6, , 10, , 14,

3. 5, 10, , 20, , , 35

4. 10, , 30, 40, , , 70

5. 3, 4, 5, , 7, 8,

6. 20, 18, 16, , 10,

7. 50, , 40, 35, , , 20

8. 70, , 50, 40, , , 10

### C: Shape pattern sequences

Draw the next diagram for these patterns.

Diagram 1    Diagram 2    Diagram 3    Diagram 4

1.				
2.				



Comments: .....

Please sign:  
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# Algebra

L1MA

# 3

A3

## Homework / Assessment Worksheet

Name: \_\_\_\_\_

Class: \_\_\_\_\_

Complete by: \_\_\_\_\_

### A: 10 Quick Questions



1.  $3 + 9 =$  .....

2.  $10 + 2 =$  .....

3.  $12 - 7 =$  .....

4.  $12 - 4 =$  .....

5. $6$	6. $5$
$+ 6$	$+ 7$
_____	_____

7. $12$	8. $12$
$- 6$	$- 5$
_____	_____

9. Draw a square.

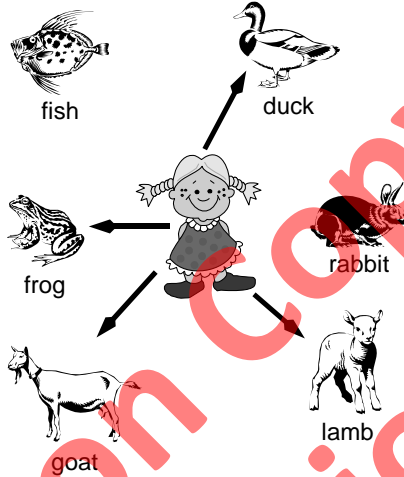
10. Add these coins and notes.



.....

### B: Relationship diagrams

In this diagram, the  $\rightarrow$  means 'Ann likes'.



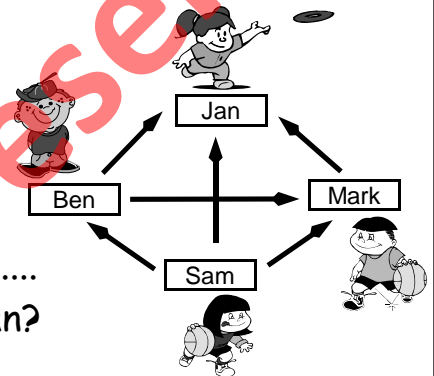
- Does Ann like fish? .....
- Does Ann like lambs? .....
- What other animals does Ann like?  
....., .....

In this diagram, the  $\rightarrow$  means 'is older than'.

1. Is Sam older than Jan? .....

2. Who else is Sam older than?  
.....

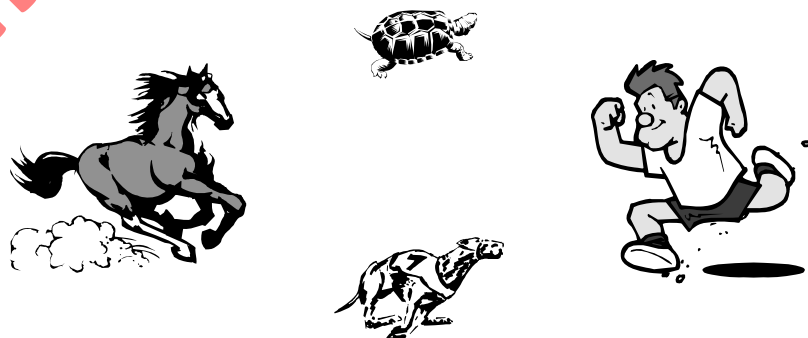
3. Who is Ben older than?  
.....



### C: Creating relationship diagrams

Add the arrows to this diagram.

The  $\rightarrow$  means 'can run faster than'.



Comments: .....

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# Algebra

L1MA

# 4

A3

## Homework / Assessment Worksheet

Name: \_\_\_\_\_

Class: \_\_\_\_\_

Complete by: \_\_\_\_\_

### A: 10 Quick Questions



1.  $6 + 7 =$  .....

2.  $4 + 9 =$  .....

3.  $13 - 9 =$  .....

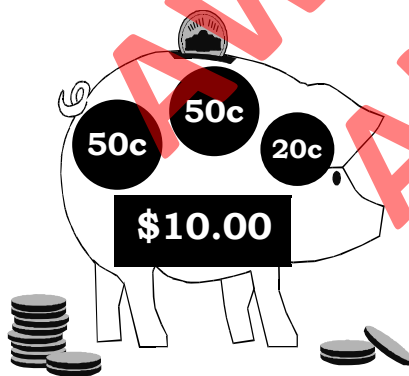
4.  $13 - 5 =$  .....

5. $10$	6. $8$
$+ 3$	$+ 5$
_____	_____

7. $13$	8. $13$
$- 8$	$- 6$
_____	_____

9. Draw a rectangle (oblong).

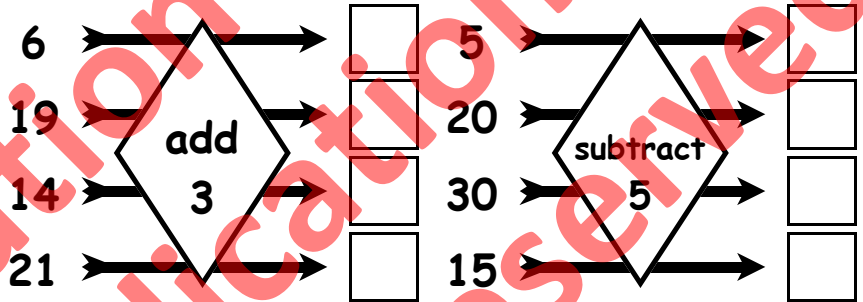
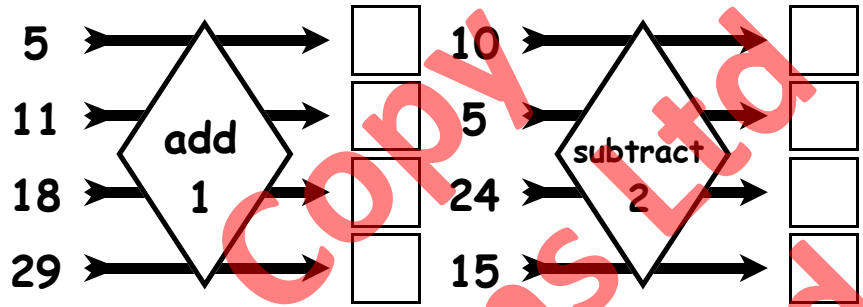
10. Add these coins and notes.



.....

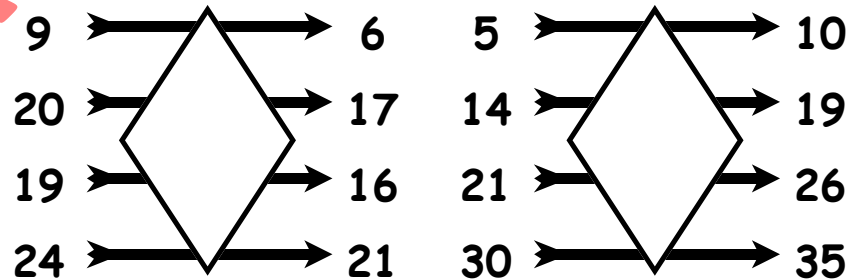
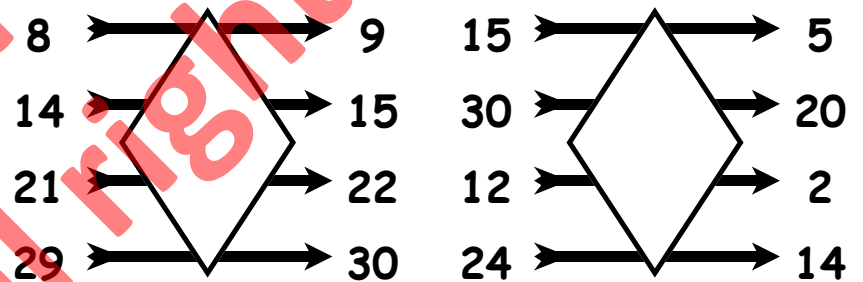
### B: Using number rules

1. Use the **rule** in the diamond to work out the missing numbers.



### C: Finding number rules

1. Look at each pair of numbers, then work out the rule that would go in the diamond.



Comments: .....

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# Algebra

L1MA



A4

## Homework / Assessment Worksheet

Name: \_\_\_\_\_

Class: \_\_\_\_\_

Complete by: \_\_\_\_\_

### A: 10 Quick Questions



1.  $7 + 8 =$  .....

2.  $10 + 5 =$  .....

3.  $15 - 9 =$  .....

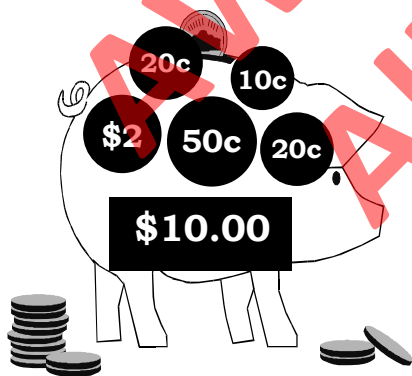
4.  $15 - 7 =$  .....

5. $9$	6. $11$
$+ 6$	$+ 4$
_____	_____

7. $15$	8. $15$
$- 10$	$- 6$
_____	_____

9. Draw a pentagon.

10. Add these coins and notes.



.....

### B: Writing number sentences (equations)

Draw in the missing shapes.

Write a number sentence below.



1. +  =      2.  + =

..... + ..... = .....      ..... + ..... = .....

3. +  = +

..... + ..... = ..... + .....

4. + = +

..... + ..... = ..... + .....

### C: Completing number sentences (equations)

Write in the missing numbers.

1.  $2 + \square = 7$       2.  $\square + 4 = 9$

3.  $\square + 4 = 3 + 7$       4.  $8 + \square = 1 + 9$

5.  $2 + 9 = 5 + \square$       6.  $8 + 3 = \square + 7$

7.  $\square + 5 = 6 + 6$       8.  $4 + \square = 9 + 3$

9.  $5 + 8 = 6 + \square$       10.  $9 + 4 = \square + 7$



Comments: .....

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# Algebra

L1MA

A4

## Homework / Assessment Worksheet



Name: \_\_\_\_\_

Class: \_\_\_\_\_

Complete by: \_\_\_\_\_

### A: 10 Quick Questions



1.  $14 + 3 =$  .....

2.  $6 + 11 =$  .....

3.  $17 - 4 =$  .....

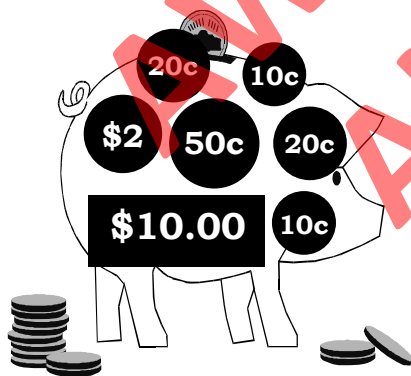
4.  $17 - 8 =$  .....

5. $15$	6. $9$
$+ 2$	$+ 8$
_____	_____

7. $17$	8. $17$
$- 7$	$- 9$
_____	_____

9. Draw a hexagon.





10. Add these coins and notes.



.....

### B: Using <, > and = symbols

Draw a 'is less than', 'is greater than' or 'is equal to' symbol between these pictures.

1.  <input type="text"/>	2.  <input type="text"/>
3.  <input type="text"/>	4.  <input type="text"/>


Draw a <, > and = symbol between these numbers.

5. $2 + 3$ <input type="text"/>	6. $3 + 3$ <input type="text"/>
7. $1 + 5$ <input type="text"/>	8. $5 + 3$ <input type="text"/>
9. $6 + 2$ <input type="text"/>	10. $7 + 3$ <input type="text"/>
11. $5 + 5$ <input type="text"/>	12. $6 + 3$ <input type="text"/>

### C: Word problems

Read each question, write an equation and work out the answer.

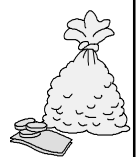


1.  Jill has 4 books and buys 5 more. How many books does Jill now have?

..... + ..... = .....

2. Jason has \$10.00 and spends \$4.00. How much money does he have left?

..... - ..... = .....



Comments: .....

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# Tracking Sheet: 'In-class' Activity Sheets

Comments

Worksheet	Objectives
<b>19</b>	A4
<b>18</b>	A4
<b>17</b>	A4
<b>16</b>	A4
<b>15</b>	A4
<b>14</b>	A3
<b>13</b>	A3
<b>12</b>	A3
<b>11</b>	A3

**Algebra**

Name

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