Name: _____   Date: _____

Maths Assessment Year 6: Algebra

1. Use simple formulae.

a) Calculate the value of the letter in each equation:

3a = 12	a =
30 = 5b	b =
8c = 72	c =
48 = 12d	d =

4 marks

b) Calculate the value of the letter in each equation:

20 = 4h + 4	h =
3i + 5 = 11	i =
14 = 6j -4	j =
2k – 5 = 5	k =

4 marks

c) In these equations, **a** is worth 7. Calculate the value of each shape:

△ = 3a	△ =
4 + a = ⬠	⬠ =
◇ = 10 - a	◇ =
a + a = ☐	☐ =

4 marks

• •

2. Generate and describe linear number sequences.

a) Fill in the first two terms in this sequence:

....   55   63   71

1 mark

b) 8 is the **first** term in this sequence. What is the 7th term? ....

8   11   14   17

1 mark

c) Find the missing numbers in this sequence:

22   ………….   …………..   70

d) The formula 5n + 1 can be used to calculate the value of the terms in this sequence:

6   11   16   21   26

Fill in the missing information in this table:

term	calculation	value
1st	5 x 1 + 1	6
5th		
10th		51
20th	5 x 20 + 1	

e)   3   7   11   15   19

11 is the **third** term in this sequence. Circle the formula that could be used to calculate this term:

3 x 4 - 1	3 x 5 - 1	3 x 4 + 1

f)   12   22   32   42   52

12 is the **first** term in this sequence. Calculate the 9th term, **showing the formula you would use:**

....

3. Express missing number problems algebraically.

a) A plumber charges £16 for each job that he attends, and then £9 per hour for every hour that he works. Circle the formula that could be used to calculate how much the plumber would charge for a job:

h stands for the number of hours worked

9h - 16	16h + 9	9h + 16

b) Emily and Becky are sisters. This formula can be used to calculate Becky's age, compared to Emily's age:

e + 4 = b

e stands for Emily's age.

b stands for Becky's age.

When Emily is 11, how old will Becky be?   ....

When Becky is 17, how old will Emily be?   ....

c) A gardener calculates the perimeter of a garden to work out how much fencing is needed. She uses this formula:

l + w + l + w

l stands for the length of the garden.

w stands for the width of the garden.

Simplify this formula:

....

d) A builder needs to calculate the area of a bathroom floor, to work out how much it will cost to tile it. Tiles cost £5 per square metre, plus £10 for delivery. He uses this formula:

5a + 10

a stands for area of the floor (in square metres).

Calculate the **cost** of tiling a floor, where the area is 10 square metres:

....

Calculate the **area** of a floor, where the cost of tiles is £110:

....

e) A painter and decorator charges £8 for every hour that she works, and she is currently offering a discount of £5 on each job.

Write the formula she could use to calculate how much money to charge her customers.

Use **h** to represent the number of hours.

....

4. Find pairs of numbers that satisfy an equation with two unknowns.

a) Find 3 different possible pairs of values for **a** and **b** in this equation:

$$ab = 18$$

(**a** and **b** are whole numbers.)

Value of a	Value of b

b) Find 3 different possible pairs of values for **a** and **b** in this equation:

$$19 = ab + 7$$

(**a** and **b** are whole numbers.)

Value of a	Value of b

c) Calculate the value of each letter:

$ef = 21$ $e + f = 10$ $e < f$	e = …………… f = ……………
$g - h = 3$ $g + h = 9$	g = …………… h = ……………
$i \div j = 4$ $ij = 16$ $i > j$	i = …………… j = ……………

1 mark

1 mark

3 marks

Total for this page

5. Enumerate possibilities of combinations of two variables.

a) In this equation, **a** and **b** are different whole numbers which are both less than 11.

$$2a = b$$

Write the calculations that would show all the possible values of **a** and **b**:

b) Use this equation to fill in the missing information in the table below:

$$7a + 4 = b$$

Value of a	Value of b
2	
	11
4	
	25

question	answer	marks	notes
1. Use simple formulae.			
a	3a = 12 a = **4** 30 = 5b b = **6** 8c = 72 c = **9** 48 = 12d d = **4**	4	Award one mark for each answer.
b	20 = 4h + 4 h = **4** 3i + 5 = 11 i = **2** 14 = 6j - 4 j = **3** 2k − 5 = 5 k = **5**	4	Award one mark for each answer.
c	△ = 3a △ = **21** 4 + a = ⬠ = **11** ◇ = 10 - a ◇ = **3** a + a = ☐ = **14**	4	Award one mark for each answer.
2. Generate and describe linear number sequences.			
a	**39** **47** 55 63 71	1	
b	26	1	
c	22 **38** **54** 70	1	
d	Term Calculation Value 1st 5 x 1 + 1 6 5th **5 x 5 + 1** **26** 10th **5 x 10 + 1** 51 20th 5 x 20 + 1 **101**	4	Award one mark for each box correctly completed.
e	(3 x 4 − 1) 3 x 5 - 1 3 x 4 + 1	1	
f	10n + 2 = 92	2	Award two marks for the formula correctly identified. Award one mark for a correct answer, but no formula.
3. Express missing number problems algebraically.			
a	9h - 16 16h + 9 (9h + 16)	1	
b	When Emily is 11, Becky will be **15** When Becky is 17, Emily will be **13**	2	Award one mark for each correct answer.
c	(l+w) x 2 **or** 2l+2w	1	