Name:

Maths Assessment Year 6: Algebra

1. Use simple formulae.
2. Generate and describe linear number sequences.
3. Express missing number problems algebraically.
4. Find pairs of numbers that satisfy an equation with two unknowns.
5. Enumerate possibilities of combinations of two variables.

Name: Date:

40 total marks

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

Total for this page

c) Find the missing numbers in this sequence:

22 …….. …….. 70

1 mark

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	

4 marks

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

1 mark

f) 12 22 32 42 52

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

……

2 marks

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

1 marks

Total for this page

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? .....

2 marks

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:

.....

1 mark

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:

.....

1 mark

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

.....

2 marks

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.

.....

1 mark

Total for this page

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

1 mark

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

1 mark

c) Calculate the value of each letter:

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

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**:

1 mark

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

4 marks

Total for this page

Answer Sheet: Maths Assessment Year 6: Algebra

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

<table>
<tr><th>question</th><th>answer</th><th>marks</th><th>notes</th></tr>
<tr><td rowspan="2">d</td><td>The cost of tiling a floor where the area is 10 square metres would be £60</td><td>1</td><td>Award one mark for each correct answer.</td></tr>
<tr><td>The area of a floor where the tiles cost £110 would be 20 square metres</td><td>2</td><td>Award one mark if it is clear that the calculation (110 - 10) ÷ 5 has been used but the answer is wrong.</td></tr>
<tr><td>e</td><td>8h – 5
or 8 x h – 5
or (8h) – 5
or (8 x h) - 5</td><td>1</td><td></td></tr>
<tr><td colspan="4">4. Find pairs of numbers that satisfy an equation with two unknowns.</td></tr>
<tr><td>a</td><td>1 x 18
2 x 9
3 x 6</td><td>1</td><td rowspan="2">Award one mark for all three number pairs identified.</td></tr>
<tr><td>b</td><td>1 x 12
2 x 6
3 x 4</td><td>1</td></tr>
<tr><td>c</td><td>e = 3 f = 7
g = 6 h = 3
i = 8 j = 2</td><td>3</td><td>Award one mark for each pair of numbers identified.</td></tr>
<tr><td colspan="4">5. Enumerate possibilities of combinations of two variables.</td></tr>
<tr><td></td><td>1 x 2 = 2
2 x 2 = 4
3 x 2 = 6
4 x 2 = 8
5 x 2 = 10</td><td>1</td><td>Award one mark for all 5 possible combinations identified.</td></tr>
<tr><td></td><td><table><tr><td>Value of a</td><td>Value of b</td></tr><tr><td>2</td><td>18</td></tr><tr><td>1</td><td>11</td></tr><tr><td>4</td><td>32</td></tr><tr><td>3</td><td>25</td></tr></table></td><td>4</td><td></td></tr>
<tr><td colspan="2"></td><td>Total 40</td><td></td></tr>
</table>