

Validation Test: _____

$$\text{Mark: } \underline{\quad} / 25 \times 70 = \underline{\quad}$$

Investigation Due Date: _____

$$\text{Mark: } \underline{\quad} / 10 \times 30 = \underline{\quad}$$

Name: Merkling Key

- Pen/Pencil
- Calculator
- Ruler

You will need the following items:

Your mark for this investigation.

This validation test will expand on what you learnt in the first two tasks and will account for 70% of

You will be able to ask your teacher questions about the second task you completed at home before completing an in class validation.

The second will be completed at home in your own time using the information you gathered in class. It will account for 30% of this investigation.

The first task will be completed in class with your teachers.

This investigation consists of three parts.

Instructions:

Term 1, Semester 1

2015

Validation Test

Year 7 Algebra Investigation



①

four equal numbers of matches
numbers of squares multiplied by

[1]

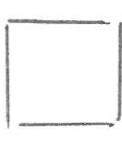
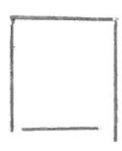
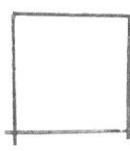
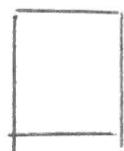
3) Describe in your own words what is happening in the pattern above

m (number of matches)	4	8	12	16	24	80	4n
s (number of squares)	1	2	3	4	6	20	n

[2.5]

2) Complete the following table. Use the diagram to help you. You may draw additional diagrams to help you.

①



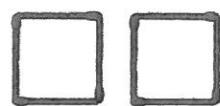
Row 4

[1]

Draw in the next row.



Row 3



Row 2



Row 1

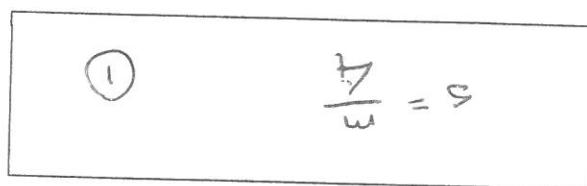
1) Consider the following pattern created with matches.

TASK 3 - MATCHSTICK SQUARES

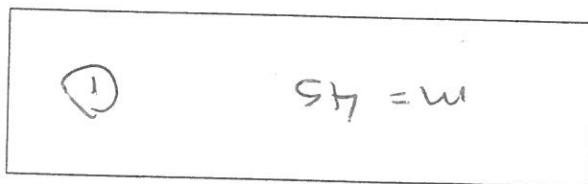
(2) each

s (number of squares)	36	126	52	144	480	208	m (number of matches)

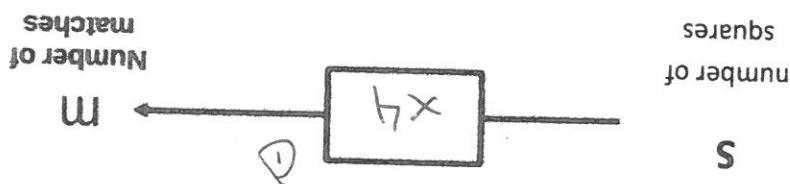
- 7) Complete the table. Use your formulae or flow charts to assist you.
- [1.5]



- 6) Write down the formula for calculating the maximum number of squares (s) we could create if we have a certain number of matches (m).
- [1]



- 5) Write down the formula for calculating the number of matches (m) required if we want to create a certain number of squares (s).
- [1]



- 4) Complete the following flow diagrams, representing the relationship between the number of hexagons and the number of matches.
- [2]

4

35 + 1 does.

Give but 43 does not work for 2. Why?

Squares into this formula. Both work for

Substitute number value of number of

[1]

formula is $m = 4x^3 + 1$ and not $m = 4x^2$

① add one equals the numbers of matches

numbers of squares multiplied by three

[1]

10) Describe in your own words what is happening in the pattern above

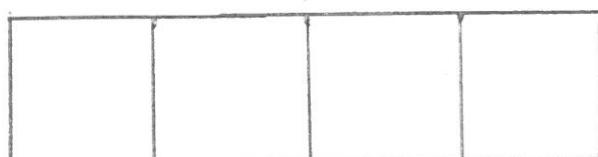
② each

m (number of matches)	4	7	10	13	19	61
s (number of squares)	1	2	3	4	6	20

[2]

9) Complete the following table. Use the diagram to help you. You may draw additional diagrams to help you.

①



Row 4

[1]

Draw in the next row.



Row 3



Row 2



Row 1

8) Consider the following pattern created with matches.

13) $\frac{m}{3} - 1$ each

s (number of squares)	12	20	28	37	61	145	m (number of matches)
	48	70	88	137	186	341	

[2]

15) Complete the table. Use your formulae or flow charts to assist you

1) $m = \frac{3s + 1}{2}$

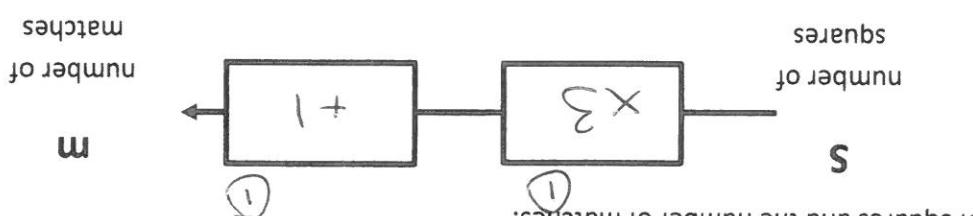
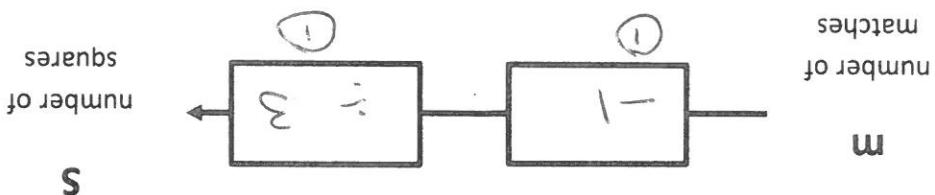
[2]

14) Write down the formula for calculating the maximum number of squares (s) we could create if we have a certain number of matches (m).

2) $s = \frac{m - 1}{3}$

[2]

13) Write down the formula for calculating the number of matches (m) required if we want to create a certain number of squares (s).



[4]

12) Complete the following flow diagrams, representing the relationship between the number of squares and the number of matches.