Grade 8 - patterns investigation - Rene Rix - model answers*

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Abstract

Model answers for patterns investigation

1 Grade 8: Mathematics: Investigation one: patterns – Model Answers

1.1 Task 1: Matchstick triangles

1.1.1 Activity 1.1:

t (number of triangles)	1	2	3	4	6	n	20
m(number of matches)	3	6	9	12	18	3n	60

Table 1

1.1.2 Activity 1.2:

t(number of triangles)	45	200
m(number of matches)	135	600

Table 2

1.2 Task 2: Matchstick squares

1.2.1 Activity 2.1

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

Table 3

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1.2.2 Activity 2.2

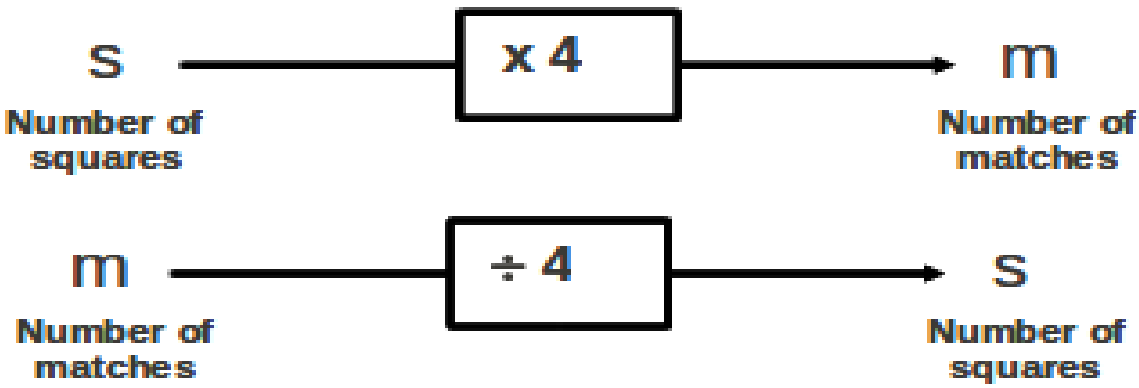

Figure 1

1.2.3 Activity 2.3

1) m = 4s
2)

$$s = \frac{m}{4} \tag{1}$$

1.2.4 Activity 2.4

s(number of square)	36	120
m(number of matches)	144	480

Table 4

1.3 Task 3: Linking matches

1.3.1 Activity 3.1

m(number of matches)	1	2	3	4	6	n	20
b(number of blobs)	0	1	2	3	5	n-1	19

Table 5

1.3.2 Activity 3.2

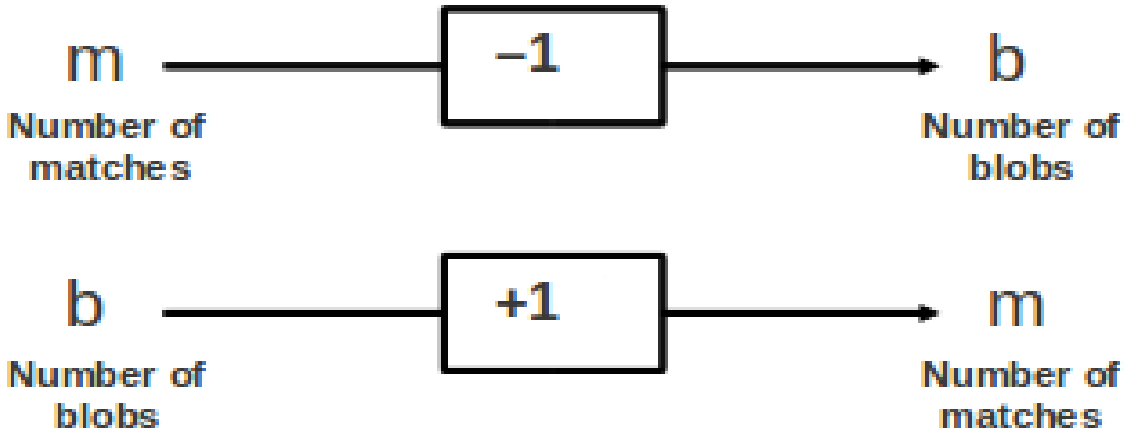

Figure 2

1.3.3 Activity 3.3

b = m - 1
m = b + 1

1.3.4 Activity 3.4

m(number of matches)	55	54
b(number of blocks)	128	127

Table 6

1.4 Task four: More matchstick triangles

1.4.1 Activity 4.1

t(number of triangles)	1	2	3	4	6	n	20
m(number of matches)	3	5	7	9	13	2n+1	41

Table 7

1.4.2 Activity 4.2

t(number of triangles)	70	126
m(number of matches)	141	253

Table 8

1.5 Task five: More matchstick squares

1.5.1 Activity 5.1

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

Table 9

1.5.2 Activity 5.2

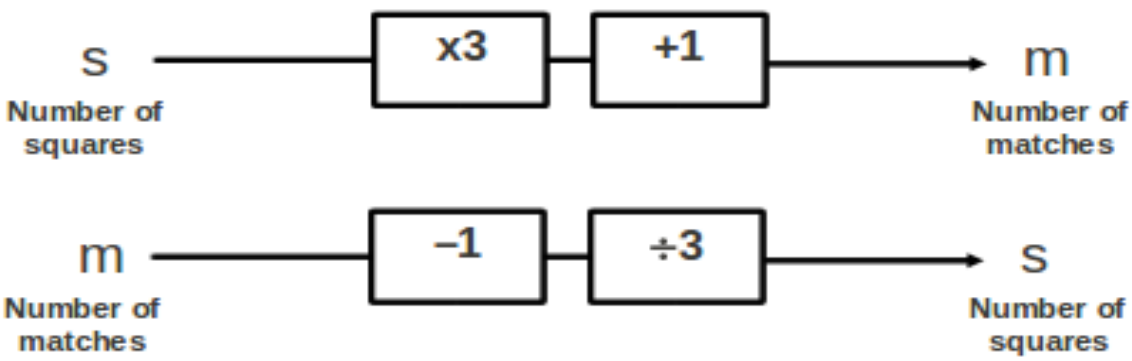

Figure 3

1.5.3 Activity 5.3

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

1.5.4 Activity 5.4

s(number of square)	234	154
m(number of matches)	703	463

Table 10

1.6 Task 6: Matchstick houses

1.6.1 Activity 6.1

m(number of matches)	1	2	3	4	6	n	20
b(number of blobs)	6	11	16	21	31	5n+1	201

Table 11

1.6.2 Activity 6.2

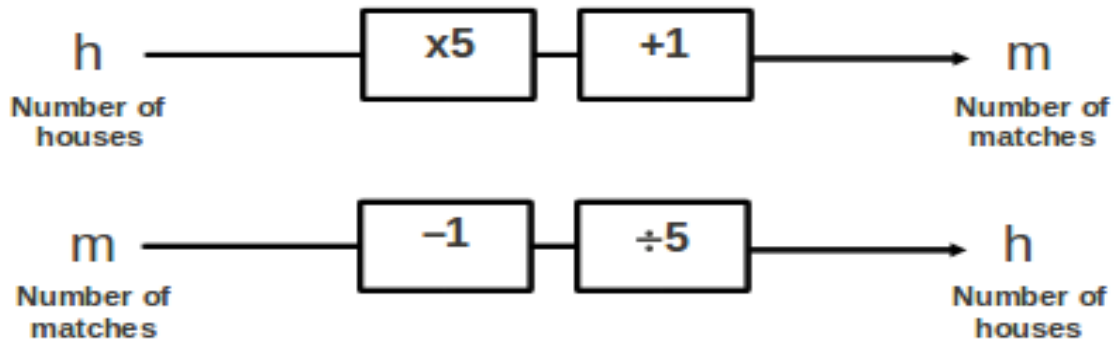

Figure 4

1.6.3 Activity 6.3

m = 5h + 1

$$h = \frac{m-1}{5} \tag{2}$$

1.6.4 Activity 6.4

h(number of houses)	120	91
m(number of matches)	601	456

Table 12