


1 Examine the matchstick pattern: ,

a Copy the pattern and add to it the next 3 members.

b Copy and complete:

<i>Unit number (n)</i>	1	2	3	4	5	6
<i>Matchsticks needed (M)</i>						

c Find the rule connecting M and n .

d Find the number of matchsticks needed to make the 23rd member.

2 Examine the matchstick pattern: ,

a Copy the pattern and add to it the next 3 members.

b Copy and complete:

<i>Unit number (n)</i>	1	2	3	4	5	6
<i>Matchsticks needed (M)</i>						

c Find the rule connecting M and n .

d Find the number of matchsticks needed to make the 43rd member.

3 Look at the following pattern: ,

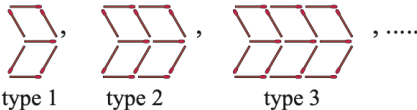
a Draw the next two members of the pattern.

b Copy and complete:

<i>Unit number (n)</i>	1	2	3	4	5
<i>Matchsticks needed (M)</i>					

c Find the rule connecting M and n .

d Find the number of matchsticks needed to make the 57th member.

4 Look at the following pattern:  ,

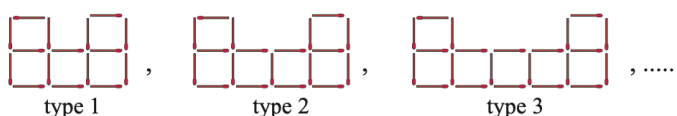
a Draw the figures for type 4 and type 5 and count the number of matchsticks to make each of them.

b Copy and complete:

<i>Type number (t)</i>	1	2	3	4	5
<i>Matchsticks needed (M)</i>					

c Find the rule connecting M and t .

d Find the number of matchsticks needed to make type 32.

5 Examine the following matchstick pattern:  ,

a Draw type 4 and type 5 diagrams and count the number of matchsticks needed to construct type 1 to type 5.

b Copy and complete:

<i>Type number (t)</i>	1	2	3	4	5
<i>Matchsticks needed (M)</i>					

c Find the rule connecting M and t .

d Find the number of matches needed to make type 19.

Challenge

Example 8

Find the rule connecting M and n in the table.

n	1	2	3	4	5
M	4	10	16	22	28

Hence, find M when $n = 522$.

As n values increase by 1, M values increase by 6.

This suggests that $M = 6 \times n \pm \square$.

Using $n = 1$, $M = 4$; $4 = 6 \times 1 - 2$, i.e., $\square = 2$.

So, the rule is $M = 6 \times n - 2$

and when $n = 522$, $M = 6 \times 522 - 2 = 3130$.

- 6 For the following tables, find the formula connecting M and n and so find M when $n = 218$.

a

n	1	2	3	4	5
M	5	9	13	17	21

b

n	1	2	3	4	5
M	7	11	15	19	23

c

n	1	2	3	4	5
M	8	13	18	23	28

d

n	1	2	3	4	5
M	8	15	22	29	36

- 7 For the following tables, find the formula connecting M and n and so find M when $n = 117$.

a

n	1	2	3	4	5
M	1	4	7	10	13

b

n	1	2	3	4	5
M	3	7	11	15	19

c

n	1	2	3	4	5
M	2	7	12	17	22

d

n	1	2	3	4	5
M	5	12	19	26	33