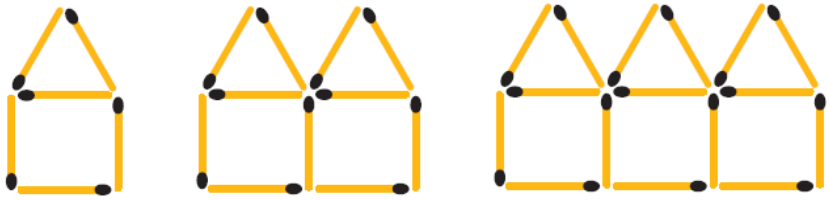
4 For each of the spatial patterns below:

- **i** Draw the next two shapes.
- **ii** Write the spatial pattern as a number pattern.
- **iii** Describe the pattern by stating how many matchsticks are required to make the first term and how many more matchsticks are required to make the next term in the pattern.

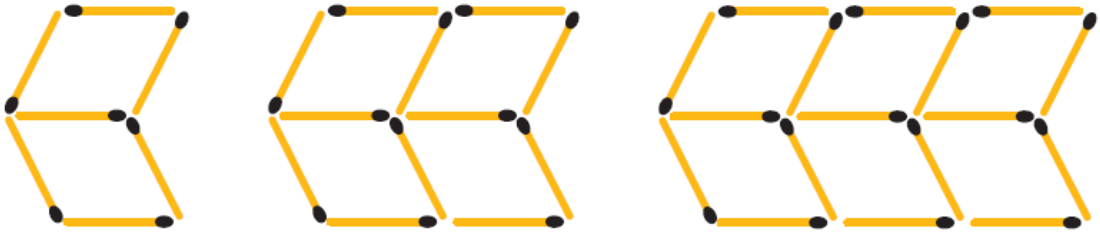
a

b

c



d



5 **a** Draw the next two shapes in this spatial pattern.

b Copy and complete the table.

Number of crosses	1	2	3	4	5
Number of matchsticks required					

c Describe a rule connecting the number of matchsticks required to the number of crosses produced.

d Use your rule to predict how many matchsticks would be required to make 20 crosses.

10 Which rule correctly describes this spatial pattern?

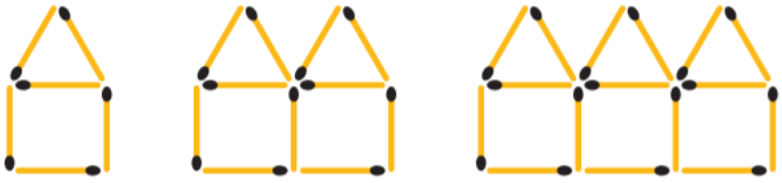
A Number of sticks = 7 × number of 'hats'

B Number of sticks = 7 × number of 'hats' + 1

C Number of sticks = 6 × number of 'hats' + 2

D Number of sticks = 6 × number of 'hats'

11 Which rule correctly describes this spatial pattern?



A Number of sticks = 5 × number of houses + 1

B Number of sticks = 6 × number of houses + 1

C Number of sticks = 6 × number of houses

D Number of sticks = 5 × number of houses

4 Match each rule (A to D) with the correct table of values (**a** to **d**).

Rule A: *output* = *input* − 5

Rule B: *output* = *input* + 1

Rule C: *output* = 4 × *input*

Rule D: *output* = 5 + *input*

a

Input	20	14	6
Output	15	9	1

b

Input	8	10	12
Output	13	15	17

c

Input	4	5	6
Output	5	6	7

d

Input	4	3	2
Output	16	12	8

5 Copy and complete each table for the given rule.

a *Output* = *input* + 3

Input	4	5	6	7	10
Output					

b *Output* = *input* × 2

Input	5	1	3	21	0
Output					

7 State the rule for each of these tables of values.

a

Input	4	5	6	7	8
Output	5	6	7	8	9

b

Input	1	2	3	4	5
Output	4	8	12	16	20

Question 1: Complete the table below:

	$n = 0$	$n = 1$	$n = 2$	$n = 3$	$n = 4$
$n + 5$					
$2n + 1$					
$n - 3$					
$3n - 1$					
n^2					
$5n$					
$100 - 2n$					
$4n + 3$					

QUESTION 2 In each of the following, complete the table of values using the given rule.

a $T = 2n + 5$

n	0	1	2	3
T				

b $T = 3n - 2$

n	1	3	5	7
T				

c $b = 2a + 4$

a	1	4	6	8
b				

d $y = x - 8$

x	40	30	24	12
y				

e $n = 5m - 1$

m	1	3	5	7
n				

f $d = 2c + 7$

c	0	1	2	3
d				

g $b = 3a$

a	1	5	10	15
b				

h $y = x^2 - 1$

x	1	2	3	4
y				

Determine which rule represents the expression the function machine used.

1)

Input (V)	10	8	5	2	3
Output	13	11	8	5	6

A. V + 3 B. V × 5 - 4
C. V + 4 D. V × 6 + 4

2)

Input (Y)	10	6	7	4	9
Output	40	24	28	16	36

A. Y × 4 B. Y + 4
C. Y × 4 + 11 D. Y × 8 + 9

3)

Input (N)	3	6	7	10	5
Output	16	37	44	65	30

A. N × 7 - 5 B. N × 7 - 7
C. N × 12 + 5 D. N × 7 + 8

4)

Input (P)	7	5	9	8	3
Output	12	10	14	13	8

A. P × 8 B. P + 5
C. P × 5 D. P × 9 + 8

QUESTION 3 For each of the tables below, discover the number pattern rule.

a

n	0	1	2	3
T	0	4	8	12

b

n	1	2	3	4
T	7	8	9	10

c

a	1	2	3	4
b	3	5	7	9

d

x	1	2	3	4
y	1	4	9	16

1 Complete each table of values using the given rules.

a $y = x + 3$

x	1	2	3	4
y				

b $y = 2x + 5$

x	0	1	2	3
y				

c $y = 3x - 4$

x	5	6	7	8
y				

d $y = 5x - 7$

x	2	3	4	5
y				

2 For each table of values in Q1, compare the differences between the y-values and the co-efficient of x in the rule. What do you notice?

3. Using your conclusion at 2., find a rule for each table of values:

a

x	1	2	3	4
y	4	8	12	16

b

x	0	1	2	3
y	6	7	8	9

c

x	4	5	6	7
y	11	13	15	17

d

p	2	3	4	5
q	5	8	11	14

e

p	1	2	3	4
q	9	14	19	24

f

p	7	8	9	10
q	47	54	61	68

g

a	4	5	6	7
b	17	19	21	23

h

a	0	1	2	3
b	3	7	11	15

i

a	3	4	5	6
b	18	24	30	36

j

s	5	6	7	8
t	17	22	27	32

k

s	1	2	3	4
t	13	20	27	34

l

s	2	3	4	5
t	19	31	43	55

a

x	1	2	3	4
y	−7	−14	−21	−28

b

x	0	1	2	3
y	5	4	3	2

e

x	−4	−3	−2	−1
y	10	9	8	7

f

x	−2	−1	0	1
y	13	10	7	4

x	1	2	3	4
y	0.2	0.4	0.6	0.8

x	1	2	3	4
y	-2.5	-1.5	-0.5	0.5

4

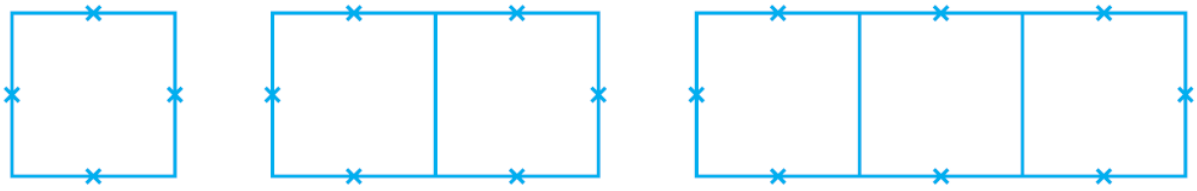
a Copy and complete this table of values.

Number of pentagons (p)	1	2	3
Number of triangles (t)			

b Write down an algebraic rule that links the number of triangles (t) to the number of pentagons (p).

c How many triangles would there be in a figure with 9 pentagons?

5



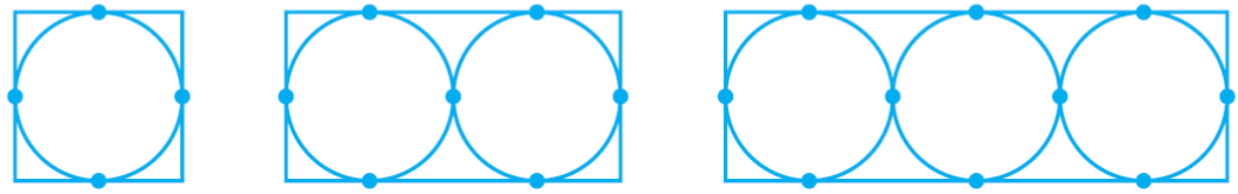
a Copy and complete this table of values.

Number of squares (s)	1	2	3
Number of crosses (c)			

b Write down an algebraic rule that links the number of crosses (c) to the number of squares (s).

c How many crosses would there be in a figure with 20 squares?

6



a Copy and complete this table of values.

Number of circles (c)	1	2	3
Number of dots (d)			

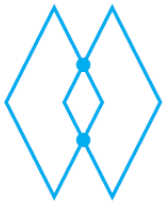
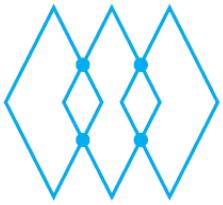
b Using words, write the rule connecting the number of dots with the number of circles.

c Write down an algebraic rule that links the number of dots (d) to the number of circles (c)

d How many dots would there be in a figure with 24 circles?

e How many circles would there be in a figure with 88 dots?

7

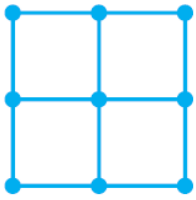
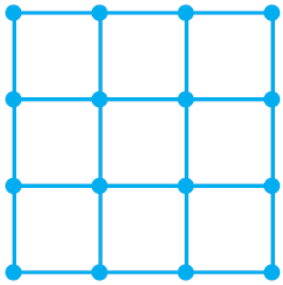
a Copy and complete this table of values.

Number of large rhombuses (r)	1	2	3
Number of dots (d)			

b Write down an algebraic rule that links the number of dots (d) to the number of large rhombuses (r).

c How many dots would there be in a figure with 40 large rhombuses?

13

a Copy and complete this table of values.

Number of squares (s)	1	4	9
Number of dots (d)			

b Write down an algebraic rule that links the number of dots (d) to the number of squares (s).

c How many dots would there be in a figure with 64 squares?