Describing sequences

- Generating a sequence from a position–to–term rule
- Writing a position–to–term rule using words
- Writing a position–to–term rule using algebra
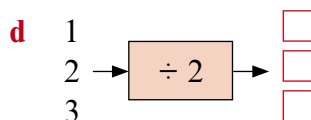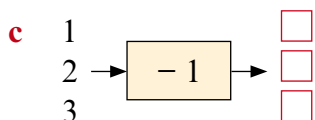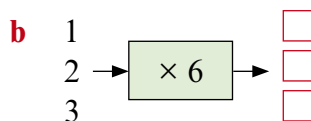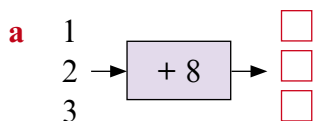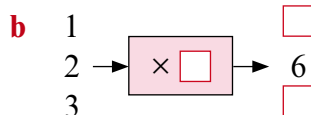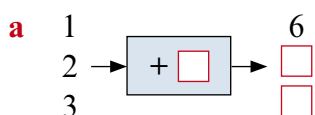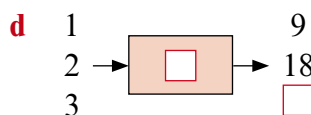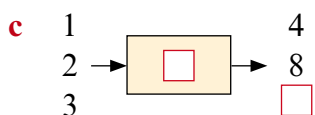
Keywords

You should know

explanation 1a   explanation 1b

1 Copy and complete each function machine.

a 1
    2 → [+ 8] → □
    3   □
                 □

b 1
    2 → [× 6] → □
    3   □
                 □

c 1
    2 → [− 1] → □
    3   □
                 □

d 1
    2 → [÷ 2] → □
    3   □
                 □

2 Copy and complete each function machine.
Find the function and the missing outputs.

a 1   6
    2 → [+ □] → □
    3   □

b 1   □
    2 → [× □] → 6
    3   □

3 Copy and complete each function machine.
Find the function and the missing outputs.

a 1   10
    2 → [□] → 11
    3   □

b 1   −1
    2 → [□] → 0
    3   □

c 1   4
    2 → [□] → 8
    3   □

d 1   9
    2 → [□] → 18
    3   □
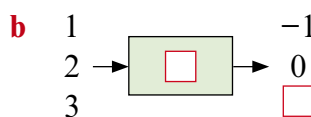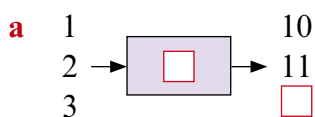
explanation 2

4 Look at this function machine and sequence table.

Position   Term
  1   5
  2   10
  3 → × 5 → ☐
  4   ☐
  5   ☐
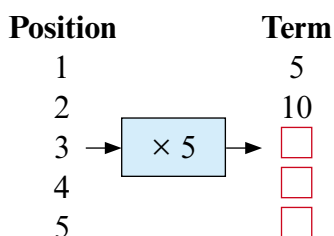
Position	1	2	3	4	5
Term	5	10			

a Copy and complete the function machine and sequence table.
Use this position-to-term rule.

Term = Position × 5

b What is the 100th term in this sequence?

*c Is 80 in this sequence? Explain how you know.

5 Look at this function machine and sequence table.

Position   Term
  1   ☐
  2   ☐
  3 → + 12 → ☐
  4   ☐
  5   ☐

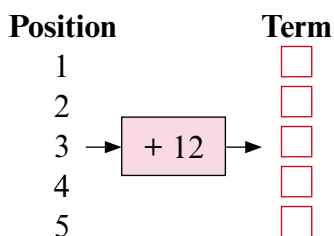| Position	1	2	3	4	5
Term					

a Copy and complete the function machine and sequence table.
Use this position-to-term rule.

Term = Position + 12

b What is the 100th term in this sequence?

*c 53 is a term in the sequence.
What is the position of this term? Explain how you know.

6 Look at this sequence table.

Position	1	2	3	4	5
Term					

   a Copy and complete the sequence table. Use this position-to-term rule.

     Term = Position − 4

   b What is the 100th term in this sequence?

  *c 20 is a term in the sequence.
     What is the position of this term? Explain how you know.

7 Look at this sequence table.

Position	1	2	3	4	5
Term					

   a Copy and complete the sequence table. Use this position-to-term rule.

     Term = Position ÷ 2

   b What is the 100th term in this sequence?

  *c 12 is a term in the sequence.
     What is the position of this term? Explain how you know.

8 Look at this sequence table.

Position	1	2	3	4	5
Term					

   a Copy and complete the sequence table. Use this position-to-term rule.

     Term = Position × 6

   b What is the 100th term in this sequence?

  *c 64 is not a term in the sequence. Explain how you know.

9 The dots are in a pattern. The pattern makes a sequence.

Pattern					
Position (P)	1	2	3	4	5
Number of dots (D)	4	5	6		

a   Copy and complete the table.

b   How can you work out the number of dots from the position?

c   i   Write a position-to-term rule.   Number of dots = _____

  ii   Write your rule using algebra. $D = P + \square$

d   How many dots would be in position 10?

*e   Describe the pattern of dots in position 10.

10 The triangles are in a pattern. The pattern makes a sequence.

Patterns					
Position (P)	1	2	3	4	5
Number of triangles (T)	2	4	6		

a   Copy and complete the table.

b   How can you work out the number of triangles from the position?

c   i   Write a position-to-term rule.   Number of triangles = _____

  ii   Write your rule using algebra. $T = P \times \square$

d   How many triangles would be in position 10?

*e   Describe the pattern of triangles in position 10.

11 The dots are in a pattern. The pattern makes a sequence.

Pattern					
Position (*P*)	1	2	3	4	5
Number of dots (*D*)	3	6	9		

   a Copy and complete the table.

   b How can you work out the number of dots from the position?

   c **i** Write a position-to-term rule.   Number of dots = _____

       ii Write your rule using algebra. $D = P \times \square$

   d How many dots would be in position 10?

  *e Describe the pattern of dots in position 10.

*12 The dots are in a pattern. The pattern makes a sequence.

Pattern					
Position (*P*)	1	2	3	4	5
Number of dots (*D*)	1	4	9		

   a Copy and complete the table.

   b How can you work out the number of dots from the position?

   c **i** Write a position-to-term rule.   Number of dots = _____

       ii Write your rule using algebra. $D = P^{\square}$

   d How many dots would be in position 10?

  *e Describe the pattern of dots in position 10.

explanation 4

13 Look at each sequence table.

      i Write a position-to-term rule for each sequence.

        Term = _____

     ii Write your rule using algebra.

        $T =$ _____

    iii What is the 100th term in each sequence?

a

Position (P)	1	2	3	4	5
Term (T)	4	8	12	16	20

b

Position (P)	1	2	3	4	5
Term (T)	10	11	12	13	14

c

Position (P)	1	2	3	4	5
Term (T)	−2	−1	0	1	2

d

Position (P)	1	2	3	4	5
Term (T)	8	16	24	32	40

e

Position (P)	1	2	3	4	5
Term (T)	−8	−7	−6	−5	−4

f

Position (P)	1	2	3	4	5
Term (T)	0.25	0.5	0.75	1	1.25