Planner

Describing sequences

- Generating a sequence from a position-to-term rule
- Writing a position-to-term rule using algebra
- Using the relationship between a term-to-term rule and a rule for the nth term

Keywords

You should know

explanation 1

1 Copy and complete the table below for each position-to-term rule.

Position	1	2	3	4	5
Term					

a Position → [+ 2] → Term

b Position → [× 2] → Term

c Position → [× 2] → [+ 2] → Term

d Position → [× 4] → [− 3] → Term

e Position → [× 5] → [+ 4] → Term

f Position → [× −2] → [+ 1] → Term

g Position → [× −3] → [− 1] → Term

h Position → [× 1.5] → [− 2] → Term

i Position → [$\times \frac{1}{4}$] → [+ 1] → Term

j Position → [÷ 4] → [+ 1] → Term

2 What do you notice about your answers to questions **1 i** and **1 j**? Why is this?

explanation 2

3 Find the position-to-term rules for these sequences.

a

Position	1	2	3	4	5
Term	3	6	9	12	15

b

Position	1	2	3	4	5
Term	4	7	10	13	16

c

Position	1	2	3	4	5
Term	5	10	15	20	25

d

Position	1	2	3	4	5
Term	3	8	13	18	23

e

Position	1	2	3	4	5
Term	3	5	7	9	11

f

Position	1	2	3	4	5
Term	−3	−1	1	3	5

g

Position	1	2	3	4	5
Term	6	7	8	9	10

h

Position	1	2	3	4	5
Term	−4	−8	−12	−16	−20

i

Position	1	2	3	4	5
Term	−3	−7	−11	−15	−19

j

Position	1	2	3	4	5
Term	2.5	3	3.5	4	4.5

explanation 3 online

4 Convert these position-to-term rules into rules for the nth term.

a Position → + 3 → Term

b Position → × 4 → Term

c Position → × 2 → − 3 → Term

d Position → × 4 → − 1 → Term

e Position → × 6 → + 1 → Term

5 Convert these position-to-term rules into rules for the nth term.

a Position → $\times -2$ → $+ 2$ → Term

b Position → $\times -3$ → $- 4$ → Term

c Position → $\times \frac{1}{2}$ → $+ 3$ → Term

d Position → $\div 2$ → $+ 3$ → Term

e Position → $\div 4$ → $- 4$ → Term

6 These are the rules for the nth terms of some arithmetic sequences.
Write the first five terms of each sequence.

a $2n$ **b** $2n - 1$ **c** $3n + 4$ **d** $5n - 1$

e $3n - 8$ **f** $4n - 4$ **g** $\frac{1}{2}n$ **h** $\frac{1}{2}n + 1$

i $-2n$ **j** $-3n + 6$ **k** $-n + 1$ **l** $-\frac{1}{4}n + 2$

7 Each table shows an arithmetic sequence.

i Write the term-to-term rule for each sequence.

ii Write the rule for the nth term of each sequence.

a

Position	1	2	3	4	5
Term	4	8	12	16	20

b

Position	1	2	3	4	5
Term	5	9	13	17	21

c

Position	1	2	3	4	5
Term	3	6	9	12	15

d

Position	1	2	3	4	5
Term	1	4	7	10	13

e

Position	1	2	3	4	5
Term	7	9	11	13	15

f

Position	1	2	3	4	5
Term	−3	−1	1	3	5

8 Each table shows an arithmetic sequence.

Write the term-to-term rule and the nth term of each sequence.

a

Position	1	2	3	4	5
Term	−2	−4	−6	−8	−10

b

Position	1	2	3	4	5
Term	−4	−6	−8	−10	−12

c

Position	1	2	3	4	5
Term	$-\frac{1}{2}$	0	$\frac{1}{2}$	1	$1\frac{1}{2}$

9 What do you notice about the term-to-term rules and the rules for the nth terms for the arithmetic sequences in questions **7** and **8**?

10 Copy and complete these sentences.

a The rule for the nth term is $3n + 1$. The term-to-term rule is …

b The rule for the nth term is $4n + 6$. The term-to-term rule is …

c The rule for the nth term is $2n - 8$. The term-to-term rule is …

d The rule for the nth term is $-3n + 1$. The term-to-term rule is …

e The rule for the nth term is $-5n - 2$. The term-to-term rule is …

f The term-to-term rule is + 2. A possible rule for the nth term is …

g The term-to-term rule is + 8. A possible rule for the nth term is …

h The term-to-term rule is − 7. A possible rule for the nth term is …

i The term-to-term rule is $+\frac{1}{2}$. A possible rule for the nth term is …

j The term-to-term rule is $-\frac{1}{4}$. A possible rule for the nth term is …

11 Write the rule for the nth term of these arithmetic sequences.

a 4, 5, 6, 7, 8 **b** 10, 15, 20, 25, 30 **c** −2, 1, 4, 7, 10

d 12, 22, 32, 42, 52 **e** 7, 13, 19, 25, 31 **f** −3, 2, 7, 12, 17

g 0, −1, −2, −3, −4 **h** 6, 4, 2, 0, −2 **i** −5.5, −5, −4.5, −4, −3.5