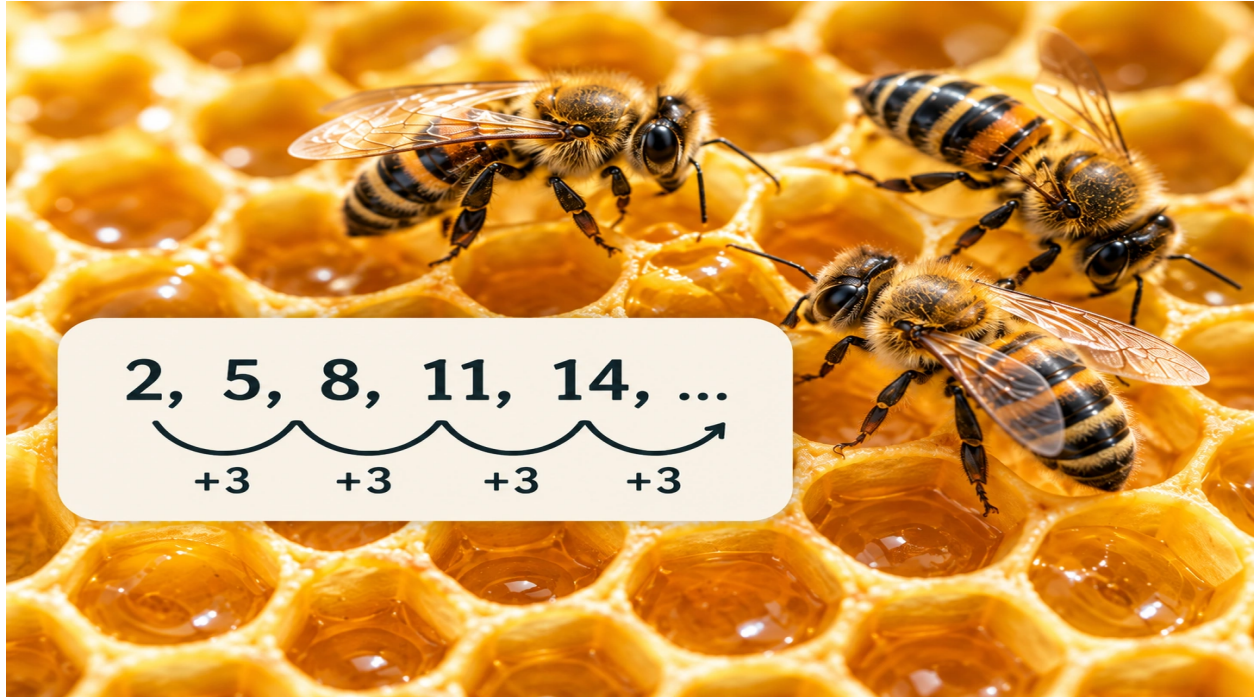


Number Patterns

Sec 1 Maths printable practice pack



What this PDF is for

Use this pack after the webpage overview. Students practise recognising number sequences, finding rules, forming general terms, using tables, and interpreting real-world patterns.

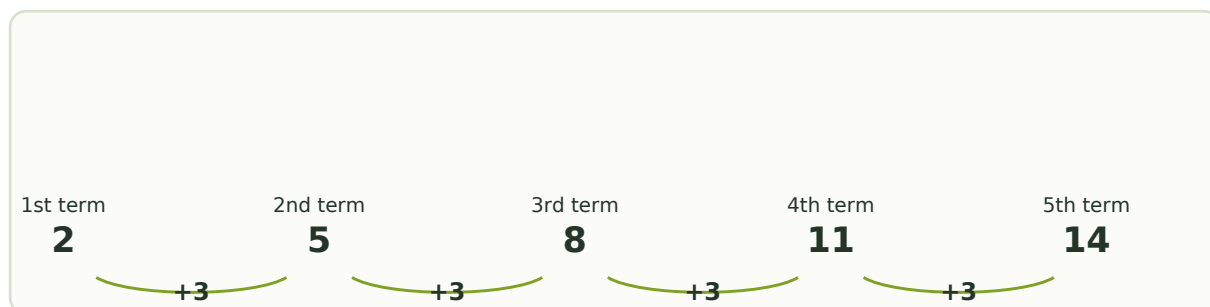
Practice load: 82 questions with answers and short explanations.

Learning goals

1. Understand what number sequences are.
2. Recognise patterns in number sequences.
3. Find formulas for the general term of simple sequences.
4. Use number patterns in real-life and diagram-based contexts.

Concept summary

A number sequence is an ordered list of numbers. Each number is called a term. The first term is T_1 , the second term is T_2 , and the n th term is T_n .



Example 1: constant difference

Sequence: 2, 5, 8, 11, 14, ... Each term increases by 3. A rule for the general term is $T_n = 3n - 1$.

Check: when $n = 1$, $T_n = 3(1) - 1 = 2$. When $n = 5$, $T_n = 3(5) - 1 = 14$.

Example 2: multiplicative pattern

Sequence: 3, 6, 12, 24, 48, ... Each term is multiplied by 2. Not every sequence is arithmetic, so students should check whether the operation is $+$, $-$, $\times$, or $\div$.

Teacher note

Ask students to write the term number row and the term value row before trying to find a formula. This reduces confusion between n and T_n .

Worked examples

Worked Example A: Find the next three terms

Sequence: 7, 10, 13, 16, ...

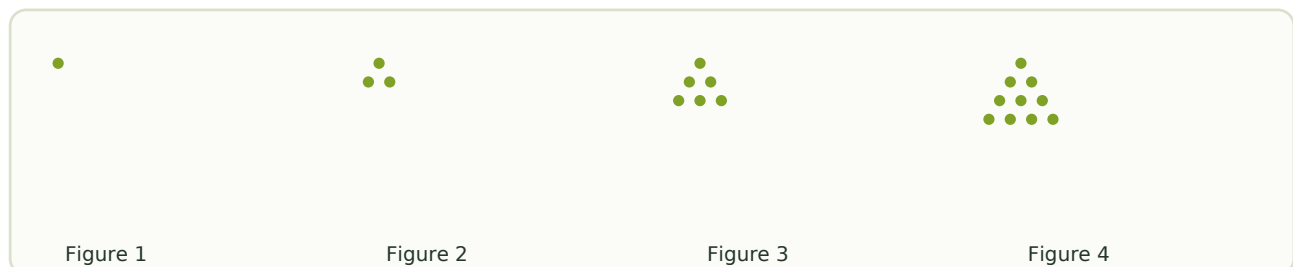
The difference is +3 each time. The next three terms are 19, 22 and 25.

Worked Example B: Find the general term

n	1	2	3	4	5
T_n	4	7	10	13	16

The difference is +3, so the formula starts with $3n$. Since $3n$ gives 3, 6, 9, 12, 15, we add 1 to get 4, 7, 10, 13, 16. So, $T_n = 3n + 1$.

Worked Example C: Figure pattern



The number of dots is 1, 3, 6, 10, ... This is a triangular-number pattern. Students should count carefully and record results in a table before guessing a rule.

Practice A - recognise the rule and continue the sequence

For each sequence, write the rule and the next three terms.

1. 2, 5, 8, 11, ...
2. 6, 10, 14, 18, ...
3. 30, 27, 24, 21, ...
4. 5, 10, 20, 40, ...
5. 96, 48, 24, 12, ...
6. 1, 4, 9, 16, ...
7. 2, 6, 12, 20, ...
8. 3, 8, 13, 18, ...
9. 50, 45, 40, 35, ...
10. 7, 14, 28, 56, ...
11. 100, 90, 80, 70, ...
12. 4, 7, 12, 19, ...

Practice B - complete tables of values

Use each rule to complete the table. Write the term values in the second row.

13. Complete the table for $T_n = 2n + 1$.

n	1	2	3	4	5
T_n					

14. Complete the table for $T_n = 3n - 1$.

n	1	2	3	4	5
T_n					

15. Complete the table for $T_n = 5n$.

n	1	2	3	4	5
T_n					

16. Complete the table for $T_n = n^2$.

n	1	2	3	4	5
T_n					

Practice B - complete tables of values continued

17. Complete the table for $T_n = n^2 + 1$.

n	1	2	3	4	5
T_n					

18. Complete the table for $T_n = 4n - 2$.

n	1	2	3	4	5
T_n					

19. Complete the table for $T_n = 10 - n$.

n	1	2	3	4	5
T_n					

20. Complete the table for $T_n = 2^n$.

n	1	2	3	4	5
T_n					

Practice C - find the general term

For each sequence, find a possible formula for T_n . Check your formula using at least the first three terms.

21. 3, 6, 9, 12, 15, ...

22. 4, 8, 12, 16, 20, ...

23. 5, 9, 13, 17, 21, ...

24. 2, 7, 12, 17, 22, ...

25. 6, 11, 16, 21, 26, ...

26. 1, 3, 5, 7, 9, ...

27. 2, 4, 6, 8, 10, ...

28. 10, 20, 30, 40, 50, ...

29. 7, 10, 13, 16, 19, ...

30. 9, 14, 19, 24, 29, ...

31. 1, 4, 9, 16, 25, ...

32. 2, 5, 10, 17, 26, ...

Practice D - use the general term

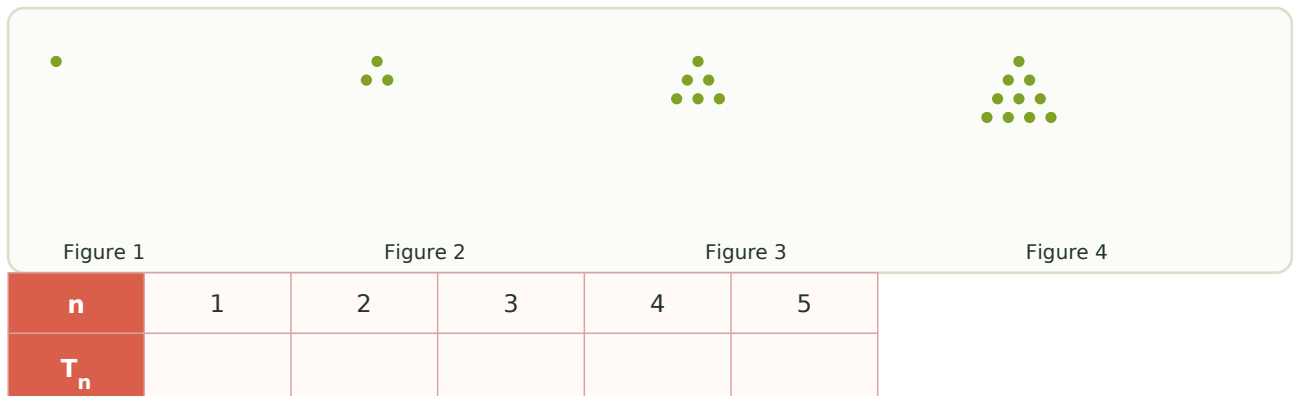
Use the given formula to find the required term, or solve for the term number.

- 33. $T_n = 3n + 2$. Find T_8 .
- 34. $T_n = 5n - 1$. Find T_{10} .
- 35. $T_n = 2n^2$. Find T_6 .
- 36. $T_n = n^2 + 3$. Find T_7 .
- 37. $T_n = 4n + 5$. Find T_{12} .
- 38. $T_n = 100 - 3n$. Find T_{15} .
- 39. $T_n = n(n + 1)$. Find T_9 .
- 40. $T_n = 2^n$. Find T_7 .
- 41. $T_n = 6n - 4$. Which term is 50?
- 42. $T_n = 4n + 1$. Which term is 45?
- 43. $T_n = n^2$. Which term is 81?
- 44. $T_n = 3n - 2$. Which term is 37?

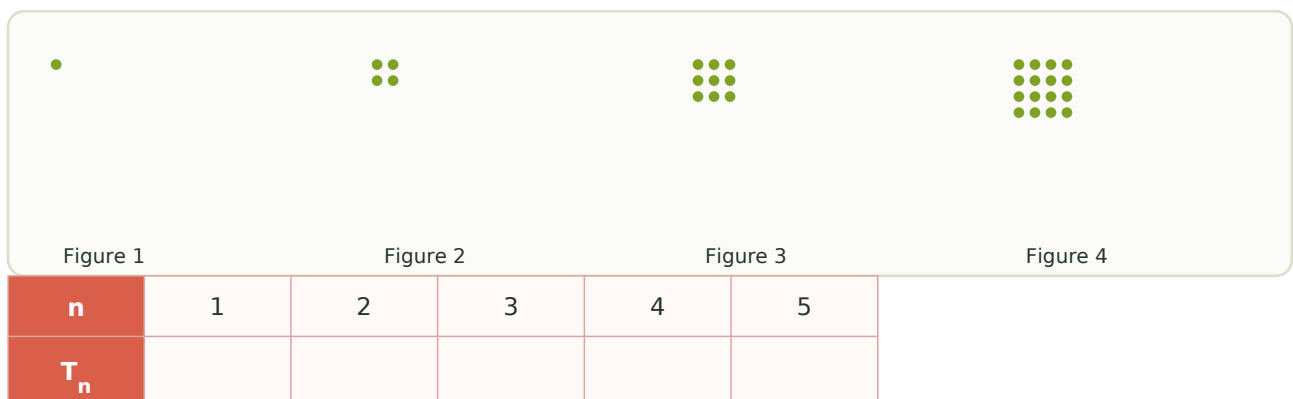
Practice E - figure and dot patterns

Count carefully. Complete the pattern table, then answer the question.

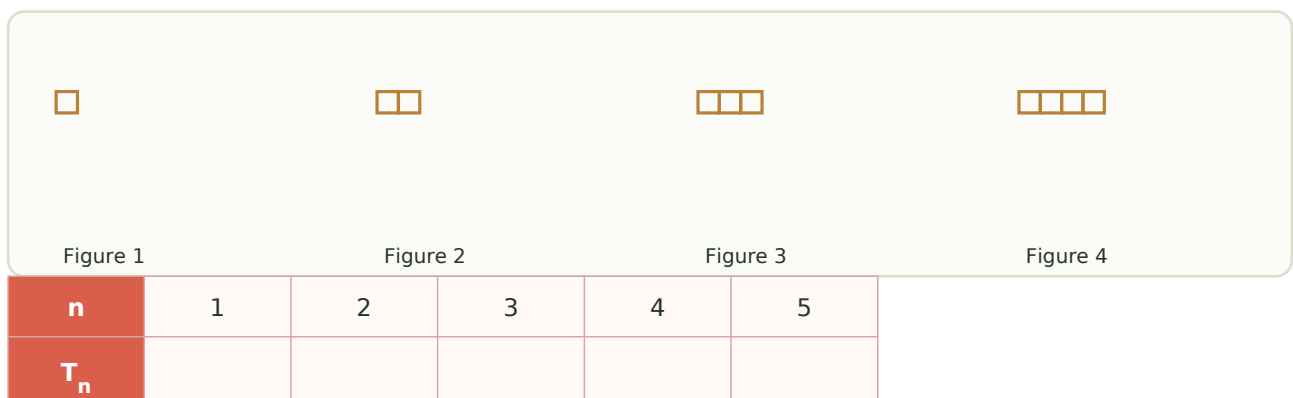
45. The figures below form a triangular-dot pattern. Count Figures 1 to 4, then predict Figure 5.



46. The figures below form a square-dot pattern. Count Figures 1 to 4, then predict Figure 5.



47. The figures below show connected squares made from matchsticks. Count the matchsticks, then predict Figure 5.



Practice E - figure and dot patterns continued

48. The figures below show a row pattern. Count the dots, then predict Figure 5.



Figure 1



Figure 2



Figure 3



Figure 4

n	1	2	3	4	5
T_n					

49. The figures below show a zig-zag dot pattern. Count the dots, then predict Figure 5.



Figure 1



Figure 2



Figure 3



Figure 4

n	1	2	3	4	5
T_n					

50. The figures below show connected triangles made from matchsticks. Count the matchsticks, then predict Figure 5.



Figure 1



Figure 2



Figure 3



Figure 4

n	1	2	3	4	5
T_n					

Practice F - real-world number patterns

51. A savings plan starts with \$5 in Week 1 and increases by \$5 each week. How much is saved in Week 8?
52. A student reads 6 pages on Day 1, 9 pages on Day 2, 12 pages on Day 3, and so on. How many pages does the student read on Day 10?
53. A taxi-style booking fee pattern is 4, 7, 10, 13, ... dollars for increasing distance bands. Find a rule for the n th band.
54. A staircase has 1 tile in the first row, 2 tiles in the second row, 3 tiles in the third row, and so on. How many tiles are needed for 10 rows?
55. A growing display uses 3, 6, 9, 12, ... lights. How many lights are used in the 20th display?
56. A plant height pattern is 8 cm, 11 cm, 14 cm, 17 cm, ... If the pattern continues, what is the height at the 12th measurement?
57. A honeycomb row pattern has 2, 5, 8, 11, ... visible cells. Find the 15th term.
58. A membership reward gives 20 points in Month 1 and adds 15 more points each month. How many points are given in Month 9?
59. A pattern of seats in rows is 12, 16, 20, 24, ... Find a formula for the number of seats in Row n .
60. A chemistry-style table shows carbon atoms increasing by 1 each row and hydrogen atoms as $2n + 2$. How many hydrogen atoms are there when $n = 8$?

Practice G - mixed revision

61. State whether this pattern is arithmetic, multiplicative, square-number, or another pattern: 2, 4, 8, 16, 32, ...
62. Find the next two terms: 81, 27, 9, 3, ...
63. Find a formula for T_n for the sequence 8, 13, 18, 23, ...
64. Find T_{12} for the sequence 1, 6, 11, 16, ...
65. Find the first five terms of $T_n = 2n^2 - 1$.
66. Which term of $T_n = 7n + 1$ is 57?
67. Complete: 1, 1, 2, 3, 5, 8, __, __.
68. Explain why 2, 5, 10, 17, 26, ... is not an arithmetic sequence.
69. A pattern has $T_n = n^2 + n$. Find T_4 and T_{10} .
70. A student says the formula for 3, 6, 9, 12, ... is $T_n = n + 2$. Explain the mistake.
71. Create your own increasing sequence with constant difference 6. Write its formula.
72. Create a figure pattern that gives the sequence 4, 7, 10, 13, ...

Challenge questions

73. The sequence 2, 6, 12, 20, 30, ... can be written as $T_n = n(n + 1)$. Find T_{20} .
74. The sequence 1, 4, 9, 16, 25, ... has $T_n = n^2$. Explain how this connects to square diagrams.
75. A sequence has $T_n = 4n - 1$. Which term is 99?
76. A figure pattern uses matchsticks to make a row of connected squares. Find a formula for the number of matchsticks in Figure n .
77. The Fibonacci sequence begins 1, 1, 2, 3, 5, 8, ... Find the next five terms.
78. A bee family pattern follows Fibonacci-style growth in a simplified model. If the terms are 1, 1, 2, 3, 5, 8, how is each new term formed?
79. A pattern has first term 7 and common difference 4. Find T_n and T_{25} .
80. A pattern has terms 5, 11, 17, 23, ... Which term is 101?
81. Find a possible formula for 2, 5, 10, 17, 26, ...
82. Explain why a formula should be checked against several terms, not just one term.

Answers and short explanations

Use these for checking after students have attempted the questions. Some figure-pattern questions may accept equivalent explanations if the counting rule is correct.

- 1 Rule +3; next: 14, 17, 20.
- 2 Rule +4; next: 22, 26, 30.
- 3 Rule -3; next: 18, 15, 12.
- 4 Rule $\times 2$; next: 80, 160, 320.
- 5 Rule $\div 2$; next: 6, 3, 1.5.
- 6 Square numbers; next: 25, 36, 49.
- 7 $n(n + 1)$; next: 30, 42, 56.
- 8 Rule +5; next: 23, 28, 33.
- 9 Rule -5; next: 30, 25, 20.
- 10 Rule $\times 2$; next: 112, 224, 448.
- 11 Rule -10; next: 60, 50, 40.
- 12 Differences +3, +5, +7; next: 28, 39, 52.
- 13 T_n : 3, 5, 7, 9, 11.
- 14 T_n : 2, 5, 8, 11, 14.
- 15 T_n : 5, 10, 15, 20, 25.
- 16 T_n : 1, 4, 9, 16, 25.
- 17 T_n : 2, 5, 10, 17, 26.
- 18 T_n : 2, 6, 10, 14, 18.
- 19 T_n : 9, 8, 7, 6, 5.
- 20 T_n : 2, 4, 8, 16, 32.
- 21 $T_n = 3n$.

Answers and short explanations continued

- 22 $T_n = 4n.$
- 23 $T_n = 4n + 1.$
- 24 $T_n = 5n - 3.$
- 25 $T_n = 5n + 1.$
- 26 $T_n = 2n - 1.$
- 27 $T_n = 2n.$
- 28 $T_n = 10n.$
- 29 $T_n = 3n + 4.$
- 30 $T_n = 5n + 4.$
- 31 $T_n = n^2.$
- 32 $T_n = n^2 + 1.$
- 33 $T_8 = 26.$
- 34 $T_{10} = 49.$
- 35 $T_6 = 72.$
- 36 $T_7 = 52.$
- 37 $T_{12} = 53.$
- 38 $T_{15} = 55.$
- 39 $T_9 = 90.$
- 40 $T_7 = 128.$
- 41 $6n - 4 = 50, \text{ so } n = 9.$
- 42 $4n + 1 = 45, \text{ so } n = 11.$

Answers and short explanations continued

- 43 $n^2 = 81$, so $n = 9$.
- 44 $3n - 2 = 37$, so $n = 13$.
- 45 Triangular dots: 1, 3, 6, 10, 15.
- 46 Square dots: 1, 4, 9, 16, 25.
- 47 Connected squares matchsticks: 4, 7, 10, 13, 16.
- 48 Row pattern: 3, 5, 7, 9, 11.
- 49 Zig-zag pattern: 4, 7, 10, 13, 16.
- 50 Connected triangles matchsticks: 3, 5, 7, 9, 11.
- 51 \$40.
- 52 33 pages.
- 53 $T_n = 3n + 1$.
- 54 55 tiles.
- 55 60 lights.
- 56 41 cm.
- 57 44 cells.
- 58 140 points.
- 59 $T_n = 4n + 8$.
- 60 18 hydrogen atoms.
- 61 Multiplicative.
- 62 1, $1/3$.
- 63 $T_n = 5n + 3$.

Answers and short explanations continued

- 64 $T_{12} = 56$.
- 65 1, 7, 17, 31, 49.
- 66 $n = 8$.
- 67 13, 21.
- 68 The differences are 3, 5, 7, 9, so they are not constant.
- 69 $T_4 = 20$ and $T_{10} = 110$.
- 70 It gives 3 for $n = 1$ but not 6 for $n = 2$; the formula does not fit all terms.
- 71 Example: 2, 8, 14, 20, ... with $T_n = 6n - 4$.
- 72 Example: connected squares or a row pattern adding 3 objects each figure.
- 73 $T_{20} = 20(21) = 420$.
- 74 n^2 counts an n by n square array.
- 75 $4n - 1 = 99$, so $n = 25$.
- 76 $T_n = 3n + 1$ for a row of n connected squares.
- 77 13, 21, 34, 55, 89.
- 78 Add the previous two terms to get the next term.
- 79 $T_n = 4n + 3$; $T_{25} = 103$.
- 80 $6n - 1 = 101$, so $n = 17$.
- 81 $T_n = n^2 + 1$.
- 82 A formula that fits one term may fail for the others; check at least the first few terms.

Teacher notes

- Start with simple arithmetic sequences before introducing nth-term notation.
- Insist that students write a two-row table: term number n and term value T_n .
- Ask students to check a proposed formula using the first three or four terms.
- For figure patterns, count systematically and record results before generalising.
- Use real-world patterns such as honeycombs, flowers, savings plans and chemistry tables to show why pattern recognition matters.
- Use the webpage for concept explanation and this PDF for classwork or homework practice.

Quality notes applied in this version

All nth-term notation is rendered as T_n with a true subscript n , not as a missing-glyph rectangle. The footer rule has been moved higher so it does not sit on top of the footer text.