

GRADE 7 MATHEMATICS

Sequences & Patterns

Complete Printable Worksheet Pack

Includes	6 Practice Worksheets + 6 Answer Keys
Skills	Term-to-Term Rules • nth-Term Rules • Algebraic Patterns • Recursive Patterns • Applications • Reasoning
Level	Grade 7 / International Curriculum Friendly
Format	A4 • Print Ready

Worksheet 1 — Number Patterns & Rules

Name: _____ Date: _____

1. Continue: 7, 12, 17, 22, __, __.
2. Continue: 81, 74, 67, 60, __, __.
3. Find the rule: 4, 9, 14, 19, 24, ...
4. Find the rule: 96, 88, 80, 72, ...
5. Continue: 3, 6, 12, 24, __, __.
6. Continue: 160, 80, 40, 20, __, __.
7. What is the next term? 2, 5, 11, 23, 47, ...
8. Find the missing term: 6, 10, 14, __, 22, 26.
9. A sequence starts at 15 and increases by 7 each time. Write the first six terms.
10. A sequence starts at 200 and is divided by 2 each time. Write the first six terms.

Show your working clearly. For pattern rules, explain how you know your rule works.

Answer Key — Worksheet 1

Check the rule as well as the final term or answer.

1. 27, 32
2. 53, 46
3. Add 5
4. Subtract 8
5. 48, 96
6. 10, 5
7. 95 (multiply by 2, then add 1)
8. 18
9. 15, 22, 29, 36, 43, 50
10. 200, 100, 50, 25, 12.5, 6.25

Worksheet 2 — Term-to-Term & Position-to-Term Rules

Name: _____ Date: _____

1. For the sequence 5, 9, 13, 17, ... write a rule for the n th term.
2. For 8, 14, 20, 26, ... write the n th-term rule.
3. Find the 10th term of 3, 7, 11, 15, ...
4. Find the 25th term of 6, 11, 16, 21, ...
5. Find the 12th term of 40, 37, 34, 31, ...
6. Which term of 4, 9, 14, 19, ... is 79?
7. Which term of 100, 94, 88, 82, ... is 46?
8. The n th term is $7n + 2$. Find the 1st, 5th and 10th terms.
9. The n th term is $50 - 3n$. Find the 4th and 12th terms.
10. A sequence has n th term $4n - 1$. Is 99 a term of the sequence? Explain.

Show your working clearly. For pattern rules, explain how you know your rule works.

Answer Key — Worksheet 2

Check the rule as well as the final term or answer.

1. $4n + 1$

2. $6n + 2$

3. 39

4. 126

5. 7

6. 16th term

7. 10th term

8. 9, 37, 72

9. 38, 14

10. Yes; $4n-1=99$ gives $n=25$.

Worksheet 3 — Patterns with Algebra

Name: _____ Date: _____

1. Simplify the pattern: 2, 5, 8, 11, ... and write its n th term.
2. A pattern has n th term $3n + 4$. Write its first five terms.
3. A pattern has n th term $20 - 2n$. Write its first six terms.
4. The first four terms are 9, 15, 21, 27. Find the n th term.
5. The first term is 12 and the common difference is -5 . Find the n th term.
6. A sequence is 2, 6, 12, 20, 30, Describe the pattern between terms and find the next two terms.
7. The sequence 1, 4, 9, 16, 25, ... follows a square-number pattern. Find the 8th term.
8. The sequence 2, 8, 18, 32, 50, ... is formed by $2n^2$. Find the 10th term.
9. A tile pattern has 5 tiles in Figure 1, 8 in Figure 2 and 11 in Figure 3. Write a rule for Figure n and find Figure 20.
10. A pattern has n th term $5n - 2$. Which term is 73?

Show your working clearly. For pattern rules, explain how you know your rule works.

Answer Key — Worksheet 3

Check the rule as well as the final term or answer.

1. $3n - 1$

2. 7, 10, 13, 16, 19

3. 18, 16, 14, 12, 10, 8

4. $6n + 3$

5. $17 - 5n$

6. Add 4, then 6, then 8, then 10... next 42, 56

7. 64

8. 200

9. $3n + 2$; Figure 20 = 62 tiles

10. 15th term

Worksheet 4 — Recursive & Growing Patterns

Name: _____ Date: _____

1. Start at 3. Add consecutive odd numbers: +1, +3, +5, +7... Write the first six terms.
2. Start at 2. Multiply by 3 each time. Write the first six terms.
3. A sequence starts 1, 1, 2, 3, 5, 8... Each term after the first two is the sum of the previous two. Write the next four terms.
4. Find the next two terms: 2, 6, 18, 54, ...
5. Find the next two terms: 5, 10, 20, 40, ...
6. A sequence follows the rule: multiply by 2, then subtract 3. Starting at 4, find the next five terms.
7. A pattern follows: 2, 7, 17, 37, Each term is multiplied by 2 and then 3 is added. Find the next two terms.
8. A sequence begins 100 and follows: subtract 10, divide by 2, subtract 10, divide by 2... Find the next six terms.
9. A pattern has 4 blocks in Figure 1. Each new figure adds 3 blocks. How many blocks are in Figure 18?
10. Explain why a term-to-term rule and an n th-term rule are useful for different purposes.

Show your working clearly. For pattern rules, explain how you know your rule works.

Answer Key — Worksheet 4

Check the rule as well as the final term or answer.

1. 3, 4, 7, 12, 19, 28
2. 2, 6, 18, 54, 162, 486
3. 13, 21, 34, 55
4. 162, 486
5. 80, 160
6. 4, 5, 7, 11, 19, 35
7. 77, 157
8. 100, 90, 45, 35, 17.5, 7.5, 3.75
9. 55 blocks
10. Term-to-term generates the next term; nth-term gives any position directly.

Worksheet 5 — Patterns in Real Life

Name: _____ Date: _____

1. A savings plan starts with \$20 and increases by \$15 each week. How much is saved in Week 10?
2. A theatre has 18 seats in Row 1 and adds 4 seats in each following row. How many seats are in Row 15?
3. A delivery route is 6 km on Day 1 and increases by 2.5 km each day. Find the distance on Day 12.
4. A plant is 14 cm tall and grows 3 cm each week. How tall is it after 9 weeks?
5. A game awards 10 points in Level 1 and increases the points by 6 each level. How many points are awarded at Level 20?
6. A machine produces 500 units on Day 1 and production decreases by 20 units each day. How many units are produced on Day 15?
7. A staircase pattern uses 3 blocks in Figure 1 and 5 more blocks for every new figure. How many blocks are in Figure 12?
8. A subscription costs \$30 in Month 1 and increases by \$4 each month. In which month will it cost \$62?
9. A runner trains 4 km on Day 1 and increases the distance by 0.75 km each day. How far does the runner train on Day 16?
10. A hall has 12 chairs in the first row, 15 in the second, 18 in the third, and so on. Find the total number of chairs in the first 10 rows.

Show your working clearly. For pattern rules, explain how you know your rule works.

Answer Key — Worksheet 5

Check the rule as well as the final term or answer.

1. \$155
2. 74 seats
3. 33.5 km
4. 41 cm
5. 124 points
6. 220 units
7. 58 blocks
8. Month 9
9. 15.25 km
10. 255 chairs

Worksheet 6 — Sequences & Patterns Challenge

Name: _____ Date: _____

1. The n th term of a sequence is $6n - 5$. Find the 20th term and determine whether 145 is a term.
2. A sequence is 7, 13, 19, 25, Which term is 181?
3. Two sequences are A: 3, 8, 13, 18, ... and B: 6, 10, 14, 18, Find the first three common terms.
4. A sequence has first term 50 and common difference -4 . Which term is -10 ?
5. A pattern has n th term $2n^2 + 1$. Find the 5th and 12th terms.
6. A sequence begins 4, 9, 19, 39, 79... Find the next two terms and describe the rule.
7. The 5th term of an arithmetic sequence is 27 and the 12th term is 62. Find the first term and common difference.
8. A pattern has 2 tiles in Figure 1, 6 in Figure 2, 12 in Figure 3 and 20 in Figure 4. Find a rule for Figure n and the number of tiles in Figure 15.
9. A sequence has n th term $3n + 7$. Another has n th term $5n - 9$. Find a positive integer n for which the terms are equal.
10. A pattern starts at 2 and alternates: multiply by 3, subtract 4, multiply by 3, subtract 4... Find the 8th term.

Show your working clearly. For pattern rules, explain how you know your rule works.

Answer Key — Worksheet 6

Check the rule as well as the final term or answer.

1. 115; yes, $n=25$ gives 145
2. 30th term
3. 18, 28, 38
4. 16th term
5. 51 and 289
6. 159, 319; multiply by 2 and add 1
7. First term 7, common difference 5
8. $n(n+1)$; Figure 15 = 240 tiles
9. 8 ($3n+7=5n-9$)
10. 82