

Name: _____ Maths Group: _____ Tutor Set: _____

Homework Booklet

KS3 Levels 3-8

Unit 8 – Sequences

Remember to use the back of a page if you need more working out space.

Complete this table indicating the homework you have been set and when it is due by.

Date	Homework	Due By	Handed In

Please take care of the booklet as you will be required to make a donation to replace it if lost or damaged beyond use.

U8 – Sequences
Completing Sequences
No Calculator Allowed

Fill in the missing numbers:

- | | |
|--|---|
| 1). 3 6 9 12 ___ ___ 21 | 2). 4 8 12 16 ___ ___ 28 |
| 3). 3 5 7 9 ___ ___ 15 | 4). 4 7 10 13 ___ ___ 22 |
| 5). 6 11 16 21 ___ ___ 36 | 6). 9 13 17 21 ___ ___ 33 |
| 7). 14 21 28 35 ___ ___ 56 | 8). 9 17 25 33 ___ ___ 57 |
| 9). 7 18 29 40 ___ ___ 73 | 10). 25 31 37 43 ___ ___ 61 |
| 11). ___ ___ 19 25 31 37 43 | 12). ___ ___ 8 11 14 17 20 |
| 13). ___ ___ 24 31 38 45 52 | 14). ___ ___ 29 33 37 41 45 |
| 15). ___ ___ 28 37 46 55 64 | 16). ___ ___ 14 21 28 35 42 |
| 17). ___ ___ 58 70 82 94 106 | 18). ___ ___ 37 46 55 64 73 |
| 19). ___ ___ 86 93 100 107 114 | 20). ___ ___ 49 55 61 67 73 |

Harder Sequences.

Fill in the missing spaces and write down the rule that the sequence follows.

- | | |
|---|--|
| 1). 1 2 4 7 ___ ___ 22 | 2). 4 6 10 16 ___ ___ 46 |
| 3). 4 5 7 10 ___ ___ 25 | 4). 24 27 31 36 ___ ___ 57 |
| 5). 47 50 54 59 ___ ___ 80 | 6). 1 4 9 16 ___ ___ 49 |
| 7). 20 23 29 ___ 50 ___ 83 | 8). 6 11 18 ___ 38 ___ 66 |
| 9). ___ ___ 25 30 37 46 ___ | 10). ___ 11 19 31 ___ ___ 91 |
| 11). 13 ___ 24 34 47 ___ 82 | 12). 5 ___ 20 40 ___ 160 320 |
| 13). 3 6 12 ___ 48 ___ 192 | 14). 1 2 ___ 8 16 ___ 64 |
| 15). 2 ___ 17 32 52 ___ 107 | 16). 45 39 34 30 ___ ___ 24 |
| 17). 75 65 56 48 ___ ___ 30 | 18). 64 50 38 28 ___ ___ 10 |
| 19). 92 86 81 77 ___ ___ 71 | 20). ___ ___ 41 33 26 20 15 |

Here is a pattern of squares.

- a) Draw the next two diagrams – use a pencil and ruler
- b) Copy and complete the table

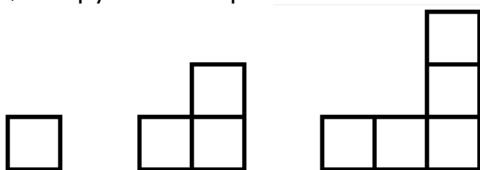


Diagram	1	2	3	4	5	6
Number of squares	1	3				
Perimeter (units)	4	8				

- c). How many squares would there be in diagram 10 ?
- d). What would be the perimeter of diagram 20 ?

U8 – Sequences
Nth Term of Sequence
No Calculator Allowed

1)

Fill in the missing spaces and write down the rule that the sequence follows.

- | | |
|---|--|
| 1). 1 2 4 7 ___ ___ 22 | 2). 4 6 10 16 ___ ___ 46 |
| 3). 4 5 7 10 ___ ___ 25 | 4). 24 27 31 36 ___ ___ 57 |
| 5). 47 50 54 59 ___ ___ 80 | 6). 1 4 9 16 ___ ___ 49 |
| 7). 20 23 29 ___ 50 ___ 83 | 8). 6 11 18 ___ 38 ___ 66 |
| 9). ___ ___ 25 30 37 46 ___ | 10). ___ 11 19 31 ___ ___ 91 |
| 11). 13 ___ 24 34 47 ___ 82 | 12). 5 ___ 20 40 ___ 160 320 |
| 13). 3 6 12 ___ 48 ___ 192 | 14). 1 2 ___ 8 16 ___ 64 |
| 15). 2 ___ 17 32 52 ___ 107 | 16). 45 39 34 30 ___ ___ 24 |
| 17). 75 65 56 48 ___ ___ 30 | 18). 64 50 38 28 ___ ___ 10 |
| 19). 92 86 81 77 ___ ___ 71 | 20). ___ ___ 41 33 26 20 15 |

2) These are the nth terms of a number of sequences. For each sequence write out the first five terms.

- i. $n + 4$ ___ , ___ , ___ , ___ , ___
- ii. $n - 1$ ___ , ___ , ___ , ___ , ___
- iii. $n + 3$ ___ , ___ , ___ , ___ , ___
- iv. $n + 12$ ___ , ___ , ___ , ___ , ___
- v. $7n$ ___ , ___ , ___ , ___ , ___
- vi. $3n$ ___ , ___ , ___ , ___ , ___
- vii. $3n - 2$ ___ , ___ , ___ , ___ , ___
- viii. $4n + 7$ ___ , ___ , ___ , ___ , ___
- ix. $2n - 2$ ___ , ___ , ___ , ___ , ___

3) Find the nth term of the following sequences

- a) 3, 5, 7, 9, 11.... _____
- b) 5, 10, 15, 20, 25.... _____
- c) 7, 15, 23, 31, 39.... _____
- d) 1, 4, 7, 10, 13.... _____
- e) 100, 110, 120, 130.... _____

U8 – Sequences
Nth Term
No Calculator Allowed

1. Complete the following sequences by completing the next two terms

- a). 5 8 11 14 17 ___ ___
- b). 3 5 7 9 11 ___ ___
- c). 4 10 16 22 28 ___ ___
- d). 37 33 29 25 21 ___ ___
- e). 1 2 4 7 11 ___ ___
- f). 4 5 7 10 14 ___ ___
- g). 2 6 10 14 18 ___ ___
- h). 9 10 12 15 19 24 ___ ___
- i). 27 24 21 18 15 ___ ___

2. These are the n^{th} terms of a number of sequences.
 For each sequence write out the first five terms.

- a) $n + 4$ ___ , ___ , ___ , ___ , ___
- b) $n - 1$ ___ , ___ , ___ , ___ , ___
- c) $n + 3$ ___ , ___ , ___ , ___ , ___
- d) $n + 12$ ___ , ___ , ___ , ___ , ___
- e) $7n$ ___ , ___ , ___ , ___ , ___
- f) $3n$ ___ , ___ , ___ , ___ , ___
- g) $3n - 2$ ___ , ___ , ___ , ___ , ___
- h) $4n + 7$ ___ , ___ , ___ , ___ , ___
- i) $2n - 2$ ___ , ___ , ___ , ___ , ___

3. Match each n^{th} term rule to its number sequence.

$4n$

4, 7, 12, 19, ...

$(n + 1)^2$

4, 8, 12, 16, ...

$n^2 + 3$

4, 9, 16, 25, ...

$n(n + 3)$

4, 10, 18, 28, ...

4. What is the n^{th} term of 4, 2, 0, -2, -4, -6....?

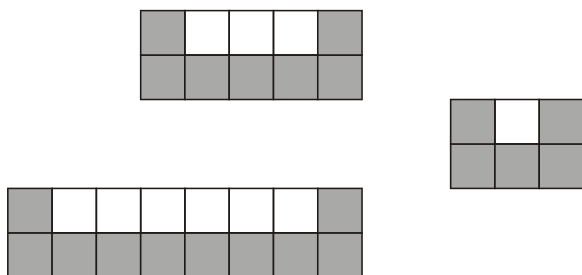
U8 – Sequences
Nth Term Sequences
No Calculator Allowed

1. Find the n th term and the 20th term for each of these sequences:

- | | | |
|-----------------------------|------------------|-------------------------------|
| a) 5, 7, 9, 11, 13, | nth term = _____ | 20 th term = _____ |
| b) 7, 11, 15, 19, 23, | nth term = _____ | 20 th term = _____ |
| c) -1, 1, 3, 5, 7, | nth term = _____ | 20 th term = _____ |
| d) 9, 12, 15, 18, 21, | nth term = _____ | 20 th term = _____ |
| e) 5, 8, 11, 14, 17, | nth term = _____ | 20 th term = _____ |
| f) -2, 1, 4, 7, 10, | nth term = _____ | 20 th term = _____ |

2. Each pattern below shows a square grid that is 2 squares high.

Only one square at each end of the top row is shaded. All squares in the bottom row are shaded.



Imagine one of these patterns that has n squares in the bottom row.
 Write an expression for the fraction of the pattern that is shaded.

3. Using the fact that the first sequences n th term is n^2 , find the n th term, by spotting the link, and then the 10th term for the remaining sequences.

- | | | |
|--------------------------------|------------------|-------------------------------|
| a) 1, 4, 9, 16, 25, | nth term = n^2 | 10 th term = _____ |
| b) 2, 8, 18, 32, 50, | nth term = _____ | 10 th term = _____ |
| c) 1, 8, 27, 64, 125, | nth term = _____ | 10 th term = _____ |
| d) 3, 6, 11, 18, 27, | nth term = _____ | 10 th term = _____ |
| e) 0.5, 2, 4.5, 8, 12.5, | nth term = _____ | 10 th term = _____ |
| f) -2, 1, 6, 13, 22, | nth term = _____ | 10 th term = _____ |

U8 – Sequences
Quadratic Sequences
No Calculator Allowed

Find the n th term of the following quadratic sequences ...

1. $6, 11, 18, 27, 38, \dots$

2. $9, 20, 37, 60, 89, \dots$

3. $0, 11, 28, 51, 80, \dots$

4. $2, 4, 7, 11, 16, \dots$

