

# ARITHMETIC SEQUENCES

**Task 1 – Work out the next three terms in each of the following sequences.**

- 1) 2, 6, 10, 14, ...
- 2) 4, 9, 14, 19, ...
- 3) 12, 15, 18, 21, ...
- 4) 72, 68, 64, 60, ...
- 5) -3, 5, 13, 21, ...
- 6) 0.5, 1, 1.5, 2, ...
- 7) 100, 93, 86, 79, ...
- 8) -15, -10, -5, 0, ...
- 9) 3.2, 3.5, 3.8, 4.1, ...
- 10) 250, 225, 200, 175, ...
- 11)  $a, 2a, 3a, 4a, \dots$
- 12)  $x + 2, x + 8, x + 14, \dots$

**Task 2 – For each of the following sequences, state the first term and the common difference.**

- 13) 18, 24, 30, 36, ...
- 14) -2, -7, -12, -17, ...
- 15) 5.5, 5.8, 6.1, 6.4, ...
- 16)  $\frac{1}{3}, \frac{2}{3}, 1, \frac{4}{3}, \dots$
- 17) 90, 75, 60, 45, ...
- 18) -40, -32, -24, -16, ...

**Task 3 – Use the  $n^{\text{th}}$  term formulas to generate the first three terms of the following sequences.**

- 19)  $n + 5$
- 20)  $2n + 3$
- 21)  $3n + 4$
- 22)  $2n + 8$
- 23)  $-n + 10$
- 24)  $7 - n$
- 25)  $-4n + 8$
- 26)  $-3n + 9$

**Task 4 – Work out the  $n^{\text{th}}$  term formula for each of the following sequences.**

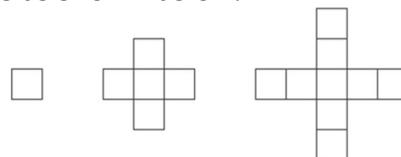
- 27) 6, 10, 14, 18, ...
- 28) -3, 4, 11, 18, ...
- 29) 4, 8, 12, 16, ...
- 30) 4, 9, 14, 19, ...
- 31) 25, 20, 15, 10, ...
- 32) 0.5, 1.5, 2.5, 3.5, ...
- 33) 100, 97, 94, 91, ...
- 34) -12, -7, -2, 3, ...
- 35)  $\frac{2}{3}, \frac{5}{3}, \frac{8}{3}, \frac{11}{3}, \dots$

**Task 5**

- 36) Consider the sequence: 2, 7, 12, 17, ...  
Is 58 a term in the sequence? Give a reason for your answer.
- 37) Consider the sequence: 16, 20, 24, 28, ...  
Is 80 a term in the sequence? Give a reason for your answer.
- 38) Consider the sequence: 5, 9, 13, 17, ...  
Is 45 a term in the sequence? Give a reason for your answer.
- 39) Consider the sequence: 12, 19, 26, 33, ...  
Is 200 a term in the sequence? Give a reason for your answer.
- 40) Consider the sequence: -8, -3, 2, 7, ...  
Is 57 a term in the sequence? Give a reason for your answer.
- 41) The first four terms of an arithmetic sequence are: 12, 16, 20, 24, ...  
Work out the 100<sup>th</sup> term of the sequence.
- 42) The first four terms of an arithmetic sequence are: 4, 10, 16, 22, ...  
Work out the 45<sup>th</sup> term of the sequence.

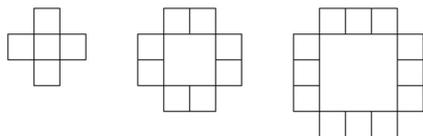
**Task 6**

- 43) A sequence of patterns is made from squares as shown below.



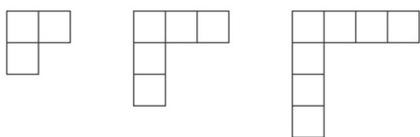
- a. Draw the next pattern in the sequence.
- b. How many squares are needed to make pattern number 8?
- c. Will there be a pattern with 37 squares? Explain your reasoning.

44) A pattern is made from squares as shown below.



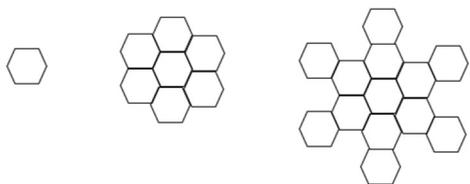
- Draw the next pattern in the sequence.
- How many squares will be in the 6<sup>th</sup> pattern?
- Will there be a pattern with 103 squares? Explain your reasoning.

45) An L-shaped pattern made from squares is shown below.



- Draw the next pattern in the sequence.
- Write an  $n^{\text{th}}$  term formula for the number of squares in the pattern.

46) A pattern is made from hexagons as shown below.



Work out the  $n^{\text{th}}$  term formula for the number of hexagons in the pattern.

47) A pattern is made from triangles as shown below.



Can the pattern be described using an arithmetic sequence? Why or why not?

### Challenge

48) The first four terms of two sequences are shown below.

Sequence A: 3, 7, 11, 15, ...

Sequence B: 1, 6, 11, 16, ...

For what value of  $n$  are the  $n^{\text{th}}$  terms equal?

49) The 5<sup>th</sup> term of an arithmetic sequence is 18. The 12<sup>th</sup> term is 46. Work out:

- The common difference
- The first term
- The formula for the  $n^{\text{th}}$  term

50) Sequence A has a first term of 4 and a common difference of 6. Sequence B has a first term of 16 and a common difference of 3. One term in each of the sequences is the same. Which term is it?

51) An arithmetic sequence has an  $n^{\text{th}}$  term formula

$$a_n = bn + c$$

- Work out the 3<sup>rd</sup> and 4<sup>th</sup> terms of the sequence in terms of  $b$  and  $c$ .

A different arithmetic sequence has an  $n^{\text{th}}$  term formula

$$a_n = 2.5bn - 2c$$

- Work out the 3<sup>rd</sup> and 4<sup>th</sup> terms of the sequence in terms of  $b$  and  $c$ .
- The 3<sup>rd</sup> term of the first sequence is 10. The 4<sup>th</sup> term of the first sequence is equal to the 4<sup>th</sup> term of the second sequence. Work out the values of  $b$  and  $c$ .