

GCSE - Mathematics**Topic:** nth term of linear and quadratic sequences**Tier: Intermediate****Grade: C/D****Starter**

Write the next two number in the following sequences.

1. 4, 11, 18,,
2. 1, 4, 9,,
3. 16, 11, 7,,

Fill in the missing numbers from these sequences.

4. 2, 4,,, 32
5. 54, 18,, 2,

Top Tips!

A linear sequence difference between each term is the same.

$$5$$

$$14, 19, 24, \dots$$

#TopTip

Write the difference above the first term

Difference of 5 between each term. The first part of the expression is $5n$
 First term is 14, $5 + 9 = 14$ The second part of the expression is $+ 9$
 The nth term is $5n + 9$

A quadratic sequence, the difference increases e.g. 2, 5, 10

$$1 \quad 4 \quad 9$$

$$2, 5, 10, \dots$$

Write down the square numbers above the sequence

A quadratic sequence is n^2 . Look at the difference between the two.
 The nth term is $n^2 + 1$

Skills:

1. Substitute the value of n into the following expressions.
 - a. $n = 4$ $3n + 2$
 - b. $n = -2$ $4n + 3$
 - c. $n = 4$ n^2
 - d. $n = 9$ $n^2 + 2$
 - e. $n = 5$ $n^2 + 3n$
2. Find the nth term for the following sequences
 - a. 1, 5, 9,
 - b. 11, 18, 25,
 - c. 3, 6, 11,
 - d. 2, 8, 18

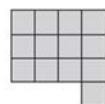
Examination Question:**2016 January Link Methods U1 Higher Q10**

The n th term of a sequence is $3n^2 + 2n - 1$.
 Calculate the 20th term of the sequence. [2]

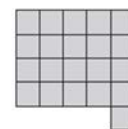
(b) The diagram shows the first 4 patterns in a sequence.



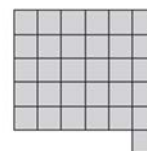
Pattern 1



Pattern 2



Pattern 3



Pattern 4

Write down an expression for number of squares in the n th pattern of the sequence. [3]

Assessment for Learning**Video / QR code**

GCSE - Mathematics**Topic:** nth term of linear and quadratic sequences**Tier:** Intermediate**Grade:** C/D**Starter**

Write the next two number in the following sequences.

- 4, 11, 18, **25, 32** (+7)
- 1, 4, 9, **16, 25** (square numbers)
- 16, 11, 7, **4, 2** (-5, -4, -3, -2)

Fill in the missing numbers from these sequences.

- 2, 4, **8, 16, 32** ($\times 2$)
- 54, 18, **6, 2, $\frac{2}{3}$** ($\div 3$)

Top Tips!

A linear sequence difference between each term is the same.

$$14, 19, 24, \dots$$

#TopTip

Write the difference above the first term

Difference of 5 between each term. The first part of the expression is $5n$
 First term is 14, $5 + 9 = 14$ The second part of the expression is $+ 9$
 The nth term is $5n + 9$

A quadratic sequence, the difference increases e.g. 2, 5, 10

$$2, 5, 10, \dots$$

Write down the square numbers above the sequence

A quadratic sequence is n^2 . Look at the difference between the two.
 The nth term is $n^2 + 1$

Skills:

- Substitute the value of n into the following expressions.
 - $n = 4$ $3n + 2$ $3 \times 4 + 2 = 14$
 - $n = -2$ $4n + 3$ $4 \times -2 + 3 = -5$
 - $n = 4$ n^2 $4^2 = 16$
 - $n = 9$ $n^2 + 2$ $9^2 + 2 = 83$
 - $n = 5$ $n^2 + 3n$ $5^2 + 3 \times 5 = 40$

- Find the nth term for the following sequences

- 1, 5, 9, $4n - 3$
- 11, 18, 25, $7n + 4$
- 3, 6, 11, $n^2 + 2$
- 2, 8, 18, $2n^2$

Examination Question:**2016 January Link Methods U1 Higher Q10**The n th term of a sequence is $3n^2 + 2n - 1$.

Calculate the 20th term of the sequence. [2]

$$n = 20 \quad 3 \times 20^2 + 2 \times 20 - 1$$

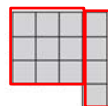
$$3 \times 400 + 40 - 1$$

$$1241$$

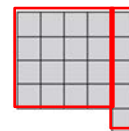
(b) The diagram shows the first 4 patterns in a sequence.



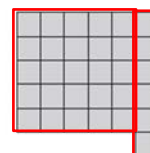
Pattern 1



Pattern 2



Pattern 3



Pattern 4

Write down an expression for number of squares in the n th pattern of the sequence. [3]

Each pattern is made up of two parts

The square is 1 greater than the pattern number
 The rectangle is 2 greater than the pattern number

$$(n + 1)^2 + (n + 2)$$

$$\text{or } n^2 + 3(n + 1)$$

Assessment for Learning**Video / QR code**

