EXAM PAPERS PRACTICE

GCSE AQA Maths 8300

Sequences

Answers

"We will help you to achieve A Star "

Answer 1

IT WILL BE IF n IS A WHOLE NUMBER IN

$$108 = 3n + 5$$
$$-5 \qquad -5$$
$$\frac{103}{3} = \frac{3n}{3}$$
$$n = \frac{103}{3}$$

THIS IS NOT A WHOLE AND SO 108 IS NOT A TERM IN THIS SEQUENCE

Answer 2

n^{th} Term $= 3n - 1$

So $(n+1)^{th}$ Term $= 3(n+1) - 1$

Answer 3

Here are the first five terms of an arithmetic sequence.

2, 5, 8, 11, 14 (+3, +3, +3, +3)

(a) Write down an expression, in terms of n, for the nth term of this sequence.

n^{th} Term $= 3n + k$ ← FIND k TO MAKE THE FORMULA WORK FOR $n = 1$

WHEN $n = 1$ TERM $= 2$.

So k MUST BE -1 so n^{th} Term $= 3n - 1$

Answer 4

Here are the first four terms of an arithmetic sequence.

11 17 23 29

(a) Find, in terms of n, an expression for the nth term of this arithmetic sequence.

n^{TH} TERM $= 6n + k$ — CHOOSE k TO MAKE THE FIRST TERM WORKS

$n = 1$: 1^{ST} TERM $= 6 + k = 11$

$-6 \quad -6$

So $k = 5$

n^{TH} TERM $= 6n + 5$

Answer 5

Here are the first five terms of an arithmetic sequence.

1 2 3 4 5

2 6 10 14 18

(a) Write down an expression, in terms of n, for the nth term of this sequence.

n^{th} TERM $= 4n + k$ — CHOOSE k TO MAKE THE FIRST TERM WORK

WHEN $n = 1$, 1^{ST} TERM IS 2

So $k = -2$

n^{th} TERM $= 4n - 2$

Answer 6

TRY SOLVING: $6n - 3 = 150$

$+3 \quad +3$

$6n = 153$

6 DOES NOT GO INTO 153

SO n WILL NOT BE A WHOLE NUMBER SO BEN IS WRONG.

Answer 7

IF IT IS n WILL BE A WHOLE NUMBER

$$6n + 5 = 121$$
$$-5 \quad -5$$
$$\frac{6n}{6} = \frac{116}{6}$$
$$n = \frac{2 \times 58}{2 \times 3}$$
$$n = \frac{58}{3}$$

SO 121 IS NOT A TERM IN THIS SEQUENCE

Answer 8

Here are the first five terms of an arithmetic sequence.

4 (+5) 9 (+5) 14 (+5) 19 (+5) 24 (+5)

(a) Find, in terms of n, an expression for the nth term of this sequence.

n^{th} TERM $= 5n + k$ → k "MAKES IT WORK"

WHEN $n = 1$ n^{th} TERM $= 4$

$$5 \times 1 + k = 4$$
$$-5 \quad -5$$
$$k = -1$$

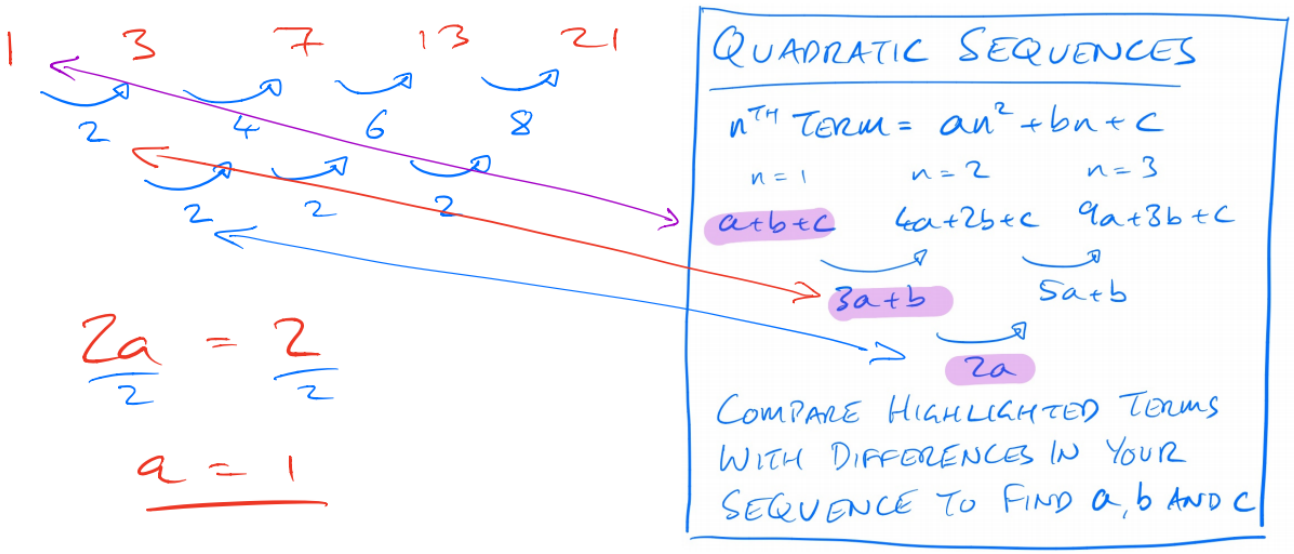
→ n^{th} TERM $= 5n - 1$

Answer 9

Here are the first 5 terms of a quadratic sequence.

1 3 7 13 21

Find an expression, in terms of n, for the nth term of this quadratic sequence.



$\frac{2a}{2} = \frac{2}{2}$

$a = 1$

$3a + b = 2$

$3 + b = 2$

$-3 \quad -3$

$b = -1$

$a + b + c = 1$

$1 - 1 + c = 1$

$c = 1$

$n^{th}\ \text{Term} = n^2 - n + 1$

Answer 10

(b) The 3rd term of this sequence is 21 and the 6th term is 96.

Find the value of a and the value of b.
You must show all your working.

$n = 6$: 6^{TH} Term $= a \times 6^2 + b \times 6$

$= 36a + 6b$

$n = 3$: $9a + 3b = 21$ — (1)

$n = 6$: $36a + 6b = 96$ — (2)

LINEAR SIMULTANEOUS EQUATIONS
USE "ELIMINATION" METHOD

$2 \times (1)$ $18a + 6b = 42$ — (3)

(2) − (3) $\frac{18a}{18} = \frac{54}{18}$

$a = 3$

→ (1) $9 \times 3 + 3b = 21$

$-27 \quad -27$

$\frac{3b}{3} = \frac{-6}{3}$

$b = -2$

Answer 11

$n=1$: $1^2+1 = 2$

$n=2$: $2^2+1 = 5$

$n=3$: $3^2+1 = 10$

Answer 12

$n=3$: 3^{RD} TERM $= a\times 3^2 + b\times 3$

$= 9a + 3b$

Answer 13

Here are the first five terms of a different sequence.

2 2 0 –4 –10

An expression for the nth term of this sequence is $3n - n^2$

(b) Write down, in terms of n, an expression for the nth term of a sequence whose first five terms are

4 4 0 –8 –20

×2

n^{th} Term $= (3n - n^2) \times 2$

$= 2(3n - n^2)$

Answer 14

(b) Show that the 5th term of S is $7 + 5\sqrt{2}$

n:	1	2	3	4	5
n^{th} Term:	$\sqrt{2}-1$	1	$\sqrt{2}+1$		

$\times(\sqrt{2}+1)$ $\times(\sqrt{2}+1)$

4^{TH} Term $= (\sqrt{2}+1)(\sqrt{2}+1)$

F O I L

$= 2 + \sqrt{2} + \sqrt{2} + 1$

$= 3 + 2\sqrt{2}$

Common Ratio $= \sqrt{2}+1$

5^{TH} Term $= (3+2\sqrt{2})(\sqrt{2}+1)$

F O I L

$= 3\sqrt{2} + 3 + 4 + 2\sqrt{2}$

$= 7 + 5\sqrt{2}$

Answer 15

The population of bacteria in flask A at the start of the 10th day is k times the population of bacteria in flask A at the start of the 6th day.

(b) Find the value of k.

$\text{DAY } n = 1000 \times 1.5^{n-1}$

$\text{DAY } 10 = 1000 \times 1.5^{9}$

$\text{DAY } 6 = 1000 \times 1.5^{5}$

$\text{DAY } 10 = k \times \text{DAY } 6$

$k = \frac{\text{DAY } 10}{\text{DAY } 6}$

$k = \frac{1000 \times 1.5^{9}}{1000 \times 1.5^{5}}$

$k = 5.0625$