

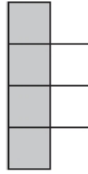
A093 Linear sequences

Q1.

Here is a sequence of patterns made with grey square tiles and white square tiles.



pattern number
1



pattern number
2



pattern number
3

(a) In the space below, draw pattern number 4

(1)

(b) Find the total number of tiles in pattern number 20

.....
(2)

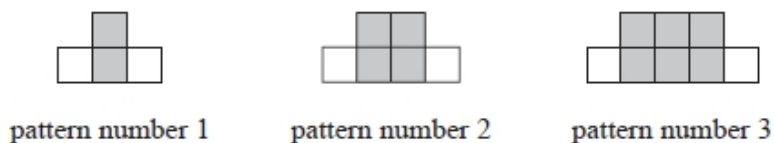
(c) Write an expression, in terms of n , for the number of grey tiles in pattern number n .

.....
(2)

(Total for question is 5 marks)

Q2.

Here is a sequence of patterns made from grey squares and white squares.



(a) In the space below, draw pattern number 4

(1)

(b) Work out the total number of squares needed to make pattern number 7

.....
(2)

Aqsa says,

"The total number of squares needed to make pattern number 20 is double the total number of squares needed to make pattern number 10"

(c) Is Aqsa correct?

Give a reason for your answer.

.....
.....
(2)

(Total for question = 5 marks)

Q3.

Here are the first six terms of an arithmetic sequence.

3 8 13 18 23 28

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

.....
(2)

The n th term of a different sequence is $3n^2$
Nathan says that the 4th term of this sequence is 144

(b) Is Nathan right? Show how you get your answer.

(1)

(Total for question = 3 marks)

Q4.

Here are the first three terms of a sequence.

32 26 20

Find the first two terms in the sequence that are less than zero.

.....
(Total for question is 3 marks)

Q5.

Here is a sequence of patterns made with counters.



pattern number 1



pattern number 2



pattern number 3

(a) Find an expression, in terms of n , for the number of counters in pattern number n .

.....
(2)

Bayo has 90 counters.

(b) Can Bayo make a pattern in this sequence using all 90 of his counters?

You must show how you get your answer.

(2)

(Total for question = 4 marks)

Q6.

Here are the first four terms of an arithmetic sequence.

6 10 14 18

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

.....
(2)

The n th term of a different arithmetic sequence is $3n + 5$

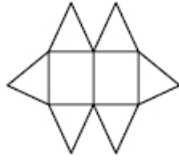
(b) Is 108 a term of this sequence? Show how you get your answer.

(2)

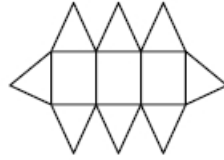
(Total for question = 4 marks)

Q7.

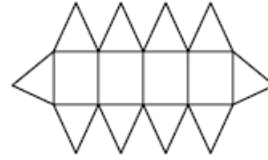
Here are the first three patterns in a sequence.
The patterns are made from triangles and rectangles.



pattern number 1



pattern number 2



pattern number 3

(a) How many triangles are there in pattern number 7?

.....
(2)



Charlie says

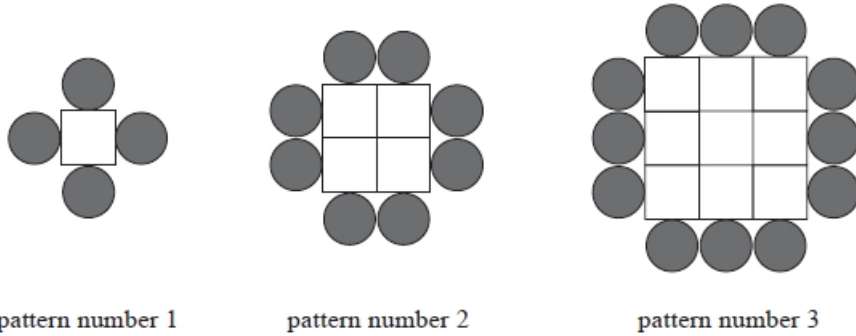
"There are 4 rectangles in pattern number 3 so there will be 8 rectangles in pattern number 6"

(b) Is Charlie right?
Give a reason for your answer.

(1)
(Total for question = 3 marks)

Q8.

A sequence of patterns is made from circular tiles  and square tiles 
 Here are the first three patterns in the sequence.



(a) How many square tiles are needed to make pattern number 6?

.....
 (2)

(b) How many circular tiles are needed to make pattern number 20?

.....
 (2)

Derek says,

"When the pattern number is odd, an odd number of square tiles is needed to make the pattern."

(c) Is Derek right?

You must give reasons for your answer.

.....

 (2)

(Total for question = 6 marks)

Q9.

Here are the first five terms of an arithmetic sequence.

2 7 12 17 22

The n th term of a different arithmetic sequence is $4n + 15$

The last term of each sequence is the same number.
There are the same number of terms in each sequence.

Find the number of terms in each sequence.

.....
(Total for question = 3 marks)

Q10.

Here are the first five numbers in a sequence.

47 41 35 29 23

(a) Find the first negative number in the sequence.

.....
(2)

Sarah says,

" -100 is **not** a number in this sequence."

(b) Is Sarah correct?
Explain why.

.....
.....
(1)

(Total for question = 3 marks)

Q11.

(a) The n th term of a sequence is $3n + 4$

Explain why 21 is not a term of this sequence.

(2)

(b) Here are the first three terms of a different sequence.

1 2 4

Write down two numbers that could be the 4th term and the 5th term of this sequence.
Give the rule you have used to get your numbers.

(2)

(Total for question = 4 marks)