1 A number sequence starts 1 2 4 7 (+1, +2, +3) 4 + 3 = 7

Emma says that the next term is 7

(a) Explain why Emma may be correct.

The sequence is going +1, +2, so the next one should be +3. So, next term after 4 is 7. (1)

(1)

Here are the first four terms of the sequence of triangle numbers.

1 (+2) 3 (+3) 6 (+4) 10

(b) Find the 8th term of this sequence.

1 2 3 4 5 6 7 8

1 3 6 10 15 21 28 36

+2 +3 +4 +5 +6 +7 +8 (1)

The 8th term is 36. (1)

36

(2)

(Total for Question 1 is 3 marks)

2 The first four terms of a Fibonacci sequence are

a $\quad$ $2a$ $\quad$ $3a$ $\quad$ $5a$

The sum of the first five terms of this sequence is 228

Work out the value of a.

5th term = 3rd term + 4th term

$= 3a + 5a$

$= 8a$ (1)

$S_5 = a + 2a + 3a + 5a + 8a$

$= 19a$ (1)

$19a = 228$

$a = 12$ (1)

12

(Total for Question 2 is 3 marks)

3 Here are the first five terms of a number sequence.

3 (+5) 8 (+5) 13 (+5) 18 (+5) 23 (+5) 28 (+5) 33

(a) Write down the next two terms of this sequence.

28 33 (1)

(1)

Jim says that 50 is a term in this sequence.
Jim is wrong.

(b) Explain why.

Every term ends either in 3 or 8. (1)

(1)

(Total for Question 3 is 2 marks)

4 Here are the first five terms of an arithmetic sequence.



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

The coefficient of n is the common difference between consecutive terms.

e.g First term = 7

$6n = 6(1) \neq 7$

$6n+1 = 6(1)+1 = 7$

adding 1 will give us 7 as first term

$6n + 1$ (2)

(2)

The nth term of a different sequence is $8 - 6n$

(b) Is -58 a term of this sequence?
You must show how you get your answer.

$8 - 6n = -58$ (1)

$6n = 58 + 8$

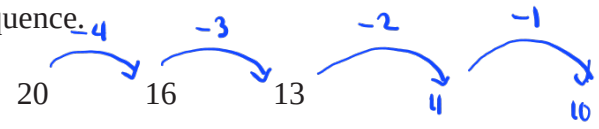
$n = \frac{66}{6}$

$= 11$

∴ Yes, -58 is the 11^{th} term of the sequence. (1) (2)

(Total for Question 4 is 4 marks)

5 Here are the first three terms of a sequence.



(i) Write down two numbers that could be the 4th and 5th terms of this sequence.

11 , 10 (1)

(1)

(ii) Write down the rule you used to get your numbers.

The difference goes down by 1 each time. (-4, -3, -2, -1)

(1) (1)

(Total for Question 5 is 2 marks)

6 Here are the first five terms of an arithmetic sequence.

–5 3 11 19 27

+8 +8

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

find the jumps : $8n$

find the term before -5 : $-5-8=-13$

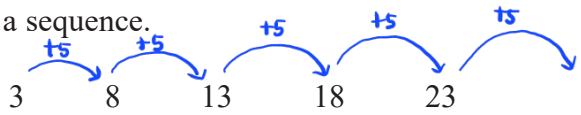
$8n-13$ ✓ (1)

✓ (1)

$8n-13$

(Total for Question 6 is 2 marks)

7 Here are the first five terms of a sequence.



(a) Write down the next term of this sequence.

$23 + 5 = 28$

28 (1)

(1)

(b) Write down the ratio of the second term to the fourth term.
Give your ratio in its simplest form.

2nd term = 8

4th term = 18

$\frac{\text{2nd}}{\text{4th}} = \frac{8 \div 2}{18 \div 2}$ (1)

$= \frac{4}{9}$

$\therefore$ 2nd term : 4th term = 4 : 9 (1)

4 : 9

(2)

(Total for Question 7 is 3 marks)

8 Here are the first four terms of an arithmetic sequence.

common difference, $d = 4$

first term, $a = 1$



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

nth term $= u_n = a + (n-1)d$

$u_n = 1 + (n-1)4$

$= 1 + 4n - 4$

$= 4n - 3$ (2)

$4n - 3$

(Total for Question 8 is 2 marks)