

Name:

Teacher  
Assessment



**Section A Continuing and Describing Sequences Grade F → D**

1. (a) Here is a sequence of numbers.

31      27      23      19      15

(i) Write down the next two numbers in the sequence.

.....

Answer ..... and .....

(2)

(ii) Write down the rule for continuing the sequence.

.....

.....

(1)

(b) Another sequence of numbers begins

3      5      9      17

The rule for continuing this sequence is

Multiply by 2 and subtract 1

(i) What is the next number in the sequence?

.....

Answer .....

(1)

(ii) The same rule is used for a sequence that starts with the number 7.

What is the second number in this sequence?

.....

Answer .....

(1)

(iii) The same rule is also used for a sequence that starts with the number  $-5$ . What is the second number in this sequence?

.....

Answer .....

(1)

**(Total 6 marks)**

2. (a) Here is a sequence of numbers.

30    25    20    15    10    .....    .....

Write down the next two numbers in the sequence.

(2)

- (b) Here is another sequence of numbers.

160    80    .....    20    10    .....    2.5

Write down the two missing numbers in this sequence.

(2)

(Total 4 marks)

3. (a) A sequence of numbers begins 40, 37, 34, 31,.....

- (i) What is the next number in the sequence?

Answer .....

(1)

- (ii) Describe in words the rule for continuing the sequence.

.....

(1)

- (b) The rule for another sequence is

Next number = Multiply the previous number by 3 then subtract 3
---

- (i) A sequence begins 2, 3, 6, 15, .....

What is the next number in the sequence?

.....

Answer .....

(1)

- (ii) Another sequence, using the same rule, starts with 4.  
What is the next number in this sequence?

.....

Answer .....

(1)

- (iii) Another sequence, using the same rule, starts with -6.  
What is the next number in this sequence?

.....

.....

Answer .....

(1)

(Total 5 marks)

4. Here is a sequence of numbers.

128 64 32  $x$  8 4  $y$  1

(a) Write down the values of  $x$  and  $y$ .

Answer  $x = \dots\dots\dots$  ,  $y = \dots\dots\dots$

(2)

(b) Write down the rule for continuing the sequence.

.....

(1)

(Total 3 marks)

5. Part of a sequence of numbers is shown below.

..... 37 31 25 19 13 .....

(a) Write down the number that comes before 37 in this sequence.

Answer.....

(1)

(b) Write down the number that comes after 13.

Answer.....

(1)

(c) Write down the rule for continuing this sequence.

.....

Answer.....

(1)

(Total 3 marks)

6. (a) A sequence of numbers is shown.

2 9 16 23 ..... .....

Write down the next two numbers in the sequence.

(2)

(b) Another sequence of numbers is shown.

2 6 12 20 .....

Write down the next number in the sequence.

(1)

(c) A different sequence begins

4 1 -2 -5

Write down the rule for this sequence.

.....

.....

(1)(Total 4 marks)

7. Write down the next **two** numbers in the sequence

23, 21, 17, 11, ....., .....

.....  
.....  
.....

Answer ....., .....

(Total 2 marks)

8. (a) A sequence of numbers starts

9 7 5 3 ... ..

Write down the next two numbers in this sequence.

.....

Answer ....., .....

(2)

(b) A different sequence uses this rule.

Add the last two numbers then halve the result
--

(i) The sequence of numbers starts

12 4 8 6 ... ..

Work out the next two numbers in this sequence.

.....  
.....

Answer ....., .....

(2)

(ii) Jenna says that the rule to find the next number in this sequence could also be: "Find the mean of the last two numbers."

Is Jenna right?  
Explain your answer.

.....  
.....  
.....  
.....

(1)

(Total 5 marks)

9. Here is a number pattern

$$1+3=4$$

$$1+3+5=9$$

$$1+3+5+7=16$$

$$\dots\dots\dots = \dots\dots\dots$$

$$\dots\dots\dots = \dots\dots\dots$$

(a) Write down the next two lines in the pattern.

(4)

(b) What special name is given to the numbers 4, 9 and 16?

Answer .....

(1)

(Total 5 marks)

10. Here is a sequence of equations.

$$x + 5 = 20$$

$$x + 4 = 19$$

$$x + 3 = 18$$

(a) Write down the next two lines of the pattern.

Answer .....

.....

(2)

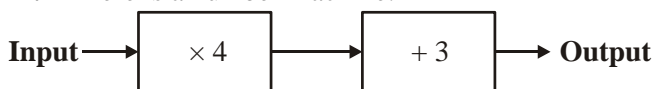
(b) Write down the value of  $x$ .

Answer .....

(1)

(Total 3 marks)

11. Here is a number machine.

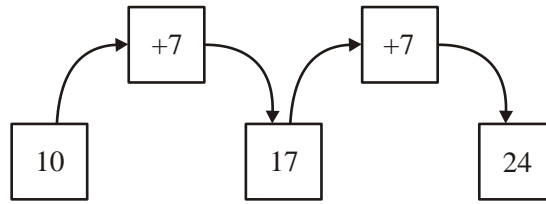


Use the number machine to complete the table.

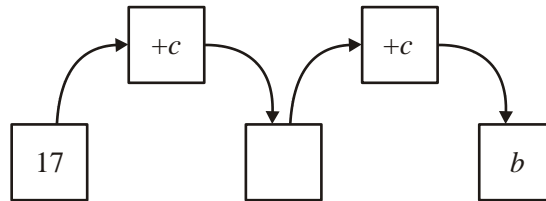
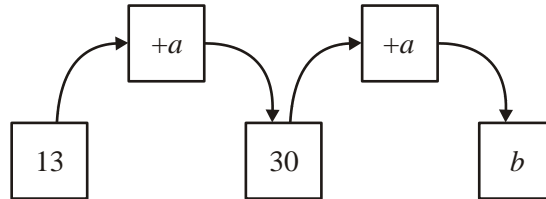
<b>Input</b>	2	5	8	10	$n$
<b>Output</b>	11				

(Total 4 marks)

12. In all of the following diagrams numbers are increased by two equal steps.  
For example:



Find  $a$ ,  $b$  and  $c$ .



.....

.....

.....

.....

.....

.....

Answer  $a = \dots\dots\dots$ ,  $b = \dots\dots\dots$ ,  $c = \dots\dots\dots$

**(Total 3 marks)**

Success:

Target:



**Section B**      **Using the  $n^{\text{th}}$  Term Formula**      **Grade D / C**

1. (a) The first term of a sequence is  $-2$ .  
The rule for continuing the sequence is

Add 7  
then  
Multiply by 4

What is the second term of the sequence?

.....  
.....  
.....

Answer .....

(1)

- (b) This rule is used to continue a different sequence.

Multiply by 2  
then  
Add 5

The second term of this sequence is 3.  
What is the first term?

.....  
.....  
.....

Answer .....

(3)

(Total 4 marks)

2. A sequence of numbers is shown.

5      9      13      17      21

- (a) Find an expression for the  $n^{\text{th}}$  term of the sequence.

.....  
.....

Answer .....

(2)

- (b) Explain why 83 will not be a term in this sequence.

.....  
.....

(2)

(Total 4 marks)

3. A sequence of numbers is shown.

2      5      8      11      14

(a) Find an expression for the  $n$ th term of the sequence.

.....

Answer .....

(2)

(b) Explain why 99 will not be a term in this sequence.

.....

.....

(2)

(Total 4 marks)

4. A pattern using pentagons is made of sticks.

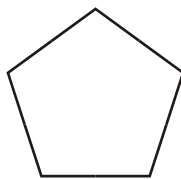


Diagram 1  
5 sticks

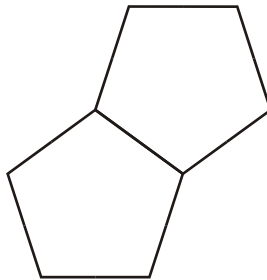


Diagram 2  
9 sticks

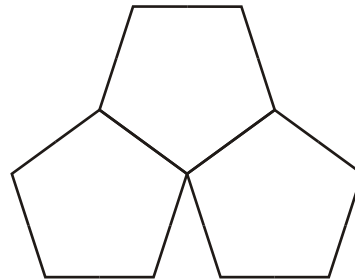


Diagram 3  
13 sticks

(a) How many sticks are needed for Diagram 5?

.....

Answer .....

(2)

(b) Write down an expression for the number of sticks in Diagram  $n$ .

.....

Answer .....

(2)

(c) Which Diagram uses 201 sticks?

.....

.....

.....

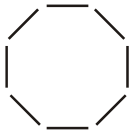
Answer .....

(3)

(Total 7 marks)



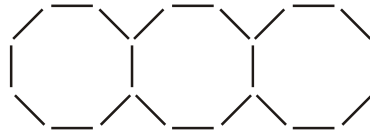
5. A sequence of patterns is made using octagons. Each octagon is made of sticks.



Pattern 1  
8 sticks



Pattern 2  
15 sticks



Pattern 3  
22 sticks

(a) (i) How many sticks are needed for Pattern 5?

Answer .....

(1)

(ii) Explain how you worked out your answer.

.....  
.....

(1)

(b) Write down an expression for the number of sticks in Pattern  $n$ .

.....

Answer .....

(2)

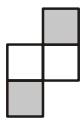
(c) Which pattern uses 358 sticks?

.....  
.....

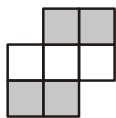
Answer .....

(2)(Total 6 marks)

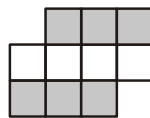
6. Patterns are made from shaded and unshaded squares.



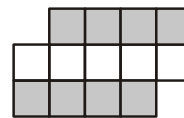
1st pattern



2nd pattern



3rd pattern



4th pattern

(a) How many shaded squares are there in the  $n$ th pattern?

.....

Answer .....

(1)

(b) How many unshaded squares are there in the  $n$ th pattern?

.....

Answer .....

(1)(Total 2 marks)

7. The  $n$ th term of a sequence is given by the expression  $n^2 - 3$   
Write down the first three terms of the sequence.

.....  
.....

Answer ....., ....., .....

(Total 2 marks)

8. (a) Write down the first three terms of the sequence whose  $n$ th term is given by

$$\frac{5n}{4n+7}$$

.....  
.....

Answer .....

(2)

- (b) Which term of the sequence has a value of 1?

.....  
.....  
.....

Answer .....

(2)

(Total 4 marks)

9. Here are the  $n$ th terms of 3 sequences.

Sequence 1	$n$ th term	$4n + 1$
Sequence 2	$n$ th term	$3n + 3$
Sequence 3	$n$ th term	$3n - 1$

For each sequence state whether the numbers in the sequence are

- A Always multiples of 3  
S Sometimes multiples of 3  
N Never multiples of 3

.....  
.....  
.....

Success:
Target:

Answer Sequence 1 ..... Sequence 2 ..... Sequence 3 .....

(Total 3 marks)