

# NUMBER PATTERNS

Grade 10 Mathematics

Marks: 35

Time: 45 MINUTES

## TEST



### QUESTION 1

Write the first three terms of the following sequences:

S1601

1.1  $T_n = 2n - 5$

(3)

1.2  $T_n = 9 - 2T_{n-1}$  where  $T_1 = 2$

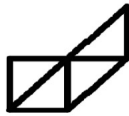
(3)

[6]

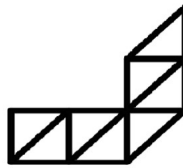
### QUESTION 2

Study the pattern below and answer the questions that follow.

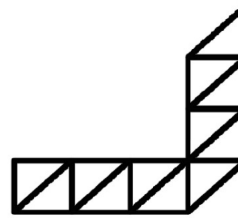
S1602



Pattern 1



Pattern 2



Pattern 3

2.1 Write down the values of  $p$  and  $q$  in the table below.

Figure	1	2	3	4
Number of triangles	4	8	$p$	$q$

(2)

2.2 Determine the general rule ( $T_n$ ) of the pattern.

(3)

2.3 Use the rule obtained in 2.2 to determine which figure will have 120 triangles.

(2)

[7]

### QUESTION 3

Given the linear number pattern:  $x ; -1 ; -5 ; -9 ; y$

S1602

3.1 Determine the value of  $x$  and  $y$ .

(2)

3.2 Determine the general term of the pattern

(3)

3.3 Calculate  $T_{40}$ , the fortieth term of the pattern

(2)

3.4 Which term of the pattern is equal to  $-101$ ?

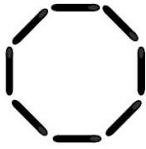
(2)

[9]

**QUESTION 4**

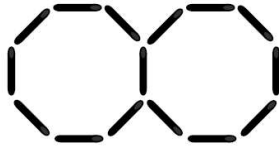
Study the following patterns made up of sticks:

S1602



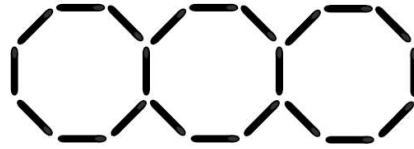
Pattern 1

8 sticks



Pattern 2

15 sticks



Pattern 3

22 sticks

- 4.1 How many sticks will the fourth pattern have? (1)
- 4.2 Write down the general term for the number of sticks in the  $n^{th}$  pattern. (3)
- 4.3 How many sticks will the  $100^{th}$  pattern have? (2)
- 4.4 Which pattern will use 351 sticks to build? (2)

[8]

**QUESTION 5**

S1603

- 5.1 If the sum of the first seven terms of a linear number pattern equals 98 and the sum of the first six terms equals 75, determine the value of the  $7^{th}$  term of the number pattern. (3)
- 5.2 If the pattern ALMOSTDONEALMOSTDONEALMOSTDONE... continuous in the same manner, what will the  $279^{th}$  letter be? (2)

[5]

**Total: 35 Marks**