BINA BANGSA SCHOOL SECONDARY
TOPICAL TEST
CHAPTER 5 PATTERNS

NAME: _____ **DATE:** _____

Answer all questions.

1. The first four terms in a sequence are: 7 13 19 25

(a) Write down the next two terms.

Answer: ..... [2]

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

Answer: ..... [2]

2. The nth term of a sequence is given by $T_n = 100 - 3n^2$.
Complete the table. [3]

n	1	4		16
T_n	97		−143	

3. The first term of a number sequence is 1.
This sequence follows the rule: *Add 3, then multiply by 2.*

(i) Write down the second and third terms.

Answer: ..... [2]

(ii) A second sequence follows the same rule. Its third term is 114.

Find the first term.

Answer: ..... [2]

4. The first 4 terms of a sequence are $2\frac{1}{2}, 1\frac{1}{6}, -\frac{1}{6}, -1\frac{1}{2}$.

(i) Write down the 7th term of the sequence.

Answer: ..... [1]

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

Answer: ..... [2]

(iii) One term in the sequence is $-18\frac{5}{6}$.
Find the value of n for this term.

Answer: ..... [2]

5. The first terms in a sequence of numbers T_1, T_2, T_3, … are given below.

$$T_1 = 1^3 - 2 = -1$$
$$T_2 = 2^3 - 3 = 5$$
$$T_3 = 3^3 - 4 = 23$$

(a) Write down T_4.

Answer: ..... [1]

(b) Find an expression, in terms of n for T_n.

Answer: ..... [3]

(c) Evaluate T_{18}.

Answer: ..... [1]

6. The nth term of a sequence is given by $2n^2 + 5$.

(a) Write down the first 4 terms of the sequence.

Answer: ..... [3]

(b) The first four terms of another sequence is 8, 15, 26, 41.
By comparing this sequence with the sequence in **part (a)**,
write down an expression in terms of n, for the nth term of this sequence.

Answer: ..... [1]

7.

(a) The nth term of a sequence is $n^2 + 7$.

Find the first three terms of this sequence.

Answer: ..... [2]

(b) These are the first four terms of a different sequence.

15 7 −1 −9

Find the nth term of this sequence.

Answer: ..... [2]

8. Consider the pattern:

$$2^2 + 2 \times 1 + 1^2 = 7 = 2^3 - 1^3$$
$$3^2 + 3 \times 2 + 2^2 = 19 = 3^3 - 2^3$$
$$4^2 + 4 \times 3 + 3^2 = 37 = 4^3 - 3^3$$
$$5^2 + 5 \times 4 + 4^2 = 61 = 5^3 - 4^3$$

(i) Write down the next term line in the pattern.

Answer: ..... [1]

(ii) Write down the *n*th line in the pattern.

Answer: ..... [2]

(iii) Hence, find the value of $24^2 + 24 \times 23 + 23^2$.

Answer: ..... [1]

9. Write down the first 3 terms in the sequence $\frac{1}{4}n(n+1)(n+2)$.

Answer: ..... [3]

10. The nth term of a different sequence is given by $T_n = \frac{4n+1}{195-5n}$.

(a) Use the formula to find T_5.
Give your answer as a fraction.

Answer: ..... [1]

(b) The value of T_k can be simplified to $\frac{5}{33}$.
Find the value of k.

Answer: ..... [3]

11. Consider the pattern below.

1st Line	$0^2 - 1^2 = -1$
2nd Line	$1^2 - 2^2 = -3$
3rd Line	$2^2 - 3^2 = -5$
4th Line	$3^2 - 4^2 = -7$

(a) Write down the 8th line of the pattern.

..... [1]

(b) Find the values of p and q if $p^2 - q^2 = -47$.

$p =$..... $q =$..... [2]

(c) Find the general term of the sequence $-1, -3, -5, -7, \ldots$

$T_n =$..... [2]

12. In a sequence, **the same number is subtracted each time to obtain the next term**.
The first five terms of the sequence are

41 p q r 13

(a) Find the values of *p, q, and r*.

Answer: …… [3]

(b) Write down an expression for the nth term of this sequence.

Answer: …… [2]