AMAJUBA DISTRICT MATHS

REVISION MATERIAL GR. 11 MATHEMATICS 2019
NUMBER PATTERNS

2014 (PAPER)

Question 5

5.1 The terms 14 ; a ; b ; c ; 56 are the first 5 terms of a linear sequence.
Find the values of a , b and c . (3)

5.2 A quadratic sequence has a first term of **7**.
The first difference of this sequence has a general formula of $4n + 3$.

5.2.1 Write down the values of the first four terms of this quadratic sequence. (4)

5.2.2 Find the nth term of this quadratic sequence. (5)

5.3 Given: – 39 ; – 36½ ; – 34 ; .....

5.3.1 Find the nth term of this sequence. (2)

5.3.2 Which term has the value of – 16½ ? (2)

5.3.3 Which term is the first positive term in this sequence? (3)

[19]

MARCH 2015 (KZN)

QUESTION 3
Given the quadratic equation:

4 ; 7 ; 14 ; 25 ; *m*

3.1 Write down the value of ***m***. (2)

3.2 Determine the n^{th} term of the sequence. (4)

3.3 If the first difference between the two consecutive terms in the quadratic sequence is **87**, determine the value of the t**wo** consecutive terms. (4)

3.4 Calculate ***n*** if the n^{th} term in the sequence is **4855**. (4)

JUNE 2015 (KZN)

QUESTION 3

3.1 Consider the sequence

− 3; 2; 7; 12; ……

3.1.1 Write down the next **2** terms of the sequence. (2)

3.1.2 Determine the formula for the n^{th} term of the sequence. (2)

3.2 Determine the value of ***x*** if **1; 7; 19; *x*; 61**…….is a quadratic sequence. (2)

3.3 **16; 33; 56; 85**; …… forms a quadratic sequence.

3.3.1 Write down the next term in the pattern. (1)

3.3.2 Determine the n^{th} term of the sequence. (4)

3.3.3 Which term of the sequence has a value of **2080?** (4)

3.3.4 **6; 23; 46; 75**…… continues in the same pattern as the one above.

Write down the formula for the n^{th} term of this sequence. (2)

[17]

KZN JUNE 2016

QUESTION 3

3.1 The following sequence of numbers is given:

2; 7; 12; 17; ……

3.1.1 Write down the values of the next two terms of the sequence. (2)

3.1.2 Write down the value of the first term in the sequence that will be greater than 107. (1)

3.1.3 Determine an expression for the n^{th} term of the sequence. (2)

3.1.4 Which term of the sequence will be equal to 182? (2)

3.1.5 The terms of this sequence are also the first differences of a certain quadratic sequence. If the fourth term of this quadratic sequence is 22, write down its first, second and third terms. (3)

3.2 Given the following quadratic sequence:

51; 70; 95; 126; ……

3.2.1 Write the value of the next term of the sequence. (2)

3.2.2 Determine an expression for the n^{th} term of this quadratic sequence. (5)

3.2.3 Which term of the sequence will be equal to 4063? (4)

[21]

JUNE 2016 (FREE STATE)

QUESTION 4

4.1 Write down the next TWO terms of the pattern:

1; 1; 2; 4; 3; 7; 4; … (2)

4.2 The following pattern is given: – 5; – 3; 3; 13; …

4.2.1 Give a reason why this is a quadratic pattern. (2)

4.2.2 Determine an expression for the n^{th} term of the pattern. (7)

4.2.3 Determine which term of the pattern will be equal to 445. (5)

[16]

JUNE 2016 (GAUTENG)

QUESTION 4

4.1 $T_k = 3k^2 - 4$ is the k_{th} term of a sequence.

4.1.1 Write down the first THREE terms of the sequence. (3)

4.1.2 Determine the value of k if $T_k = 71$. (3)

4.2 Given the number pattern below:

0; 5; 12; 21; ...

4.2.1 What kind of number pattern is being illustrated? Substantiate your answer. (2)

4.2.2 Determine the general term for this number pattern. (4)

4.3 Study the pattern below:

Row 1: $4^2 - 3^2 + 2^2 - 1^2 = 10$

Row 2: $5^2 - 4^2 + 3^2 - 2^2 = 14$

Row 3: $6^2 - 5^2 + 4^2 - 3^2 = 18$

Row 4: (.....)

Row 20: (.....)

Row n: $a^2 - b^2 + c^2 - d^2 = T_n$

4.3.1 Complete the patterns for Row 4 and Row 20. (2)

4.3.2 Determine the values of a; b; c; d; and T_n (in the nth Row) in terms of n.

Simplify for T_n as far as possible. (3)

[17]

NOV 2016

QUESTION 3

Consider the quadratic pattern: $-9; -6; 1; 12; x; \ldots$

3.1 Determine the value of x. (1)

3.2 Determine a formula for the n^{th} term of the pattern. (4)

3.3 A new pattern, P_n, is formed by adding 3 to each term in the given quadratic pattern. Write down the general term of P_n in the form $P_n = an^2 + bn + c$. (1)

3.4 Which term of the sequence found in QUESTION 3.3 has a value of 400? (4)

[10]

QUESTION 4

4.1 Given the linear pattern: $18; 14; 10; \ldots$

4.1.1 Write down the fourth term. (1)

4.1.2 Determine a formula for the general term of the pattern. (2)

4.1.3 Which term of the pattern will have a value of -70? (2)

4.1.4 If this linear pattern forms the first differences of a quadratic pattern, Q_n, determine the first difference between Q_{509} and Q_{510}. (2)

4.2 A quadratic pattern has a constant second difference of 2 and $T_5 = T_{17} = 29$.

4.2.1 Does this pattern have a minimum or maximum value? Justify the answer. (3)

4.2.2 Determine an expression for the n^{th} term in the form $T_n = an^2 + bn + c$. (5)

[15]

JUNE 2017 KZN

QUESTION 3

3.1 4; 10; 18; 28; ….. is a quadratic number pattern.

3.1.1 Write down the next term in the pattern. (1)

3.1.2 Determine an expression for the n^{th} term of the pattern. (4)

3.1.3 Calculate the value of the first term of the pattern that will be greater than 460. (4)

3.1.4 Determine an expression for the n^{th} term of the sequence of first differences of this quadratic number pattern. (2)

3.1.5 Between which two terms of the quadratic number pattern will the first difference be equal to 64? (3)

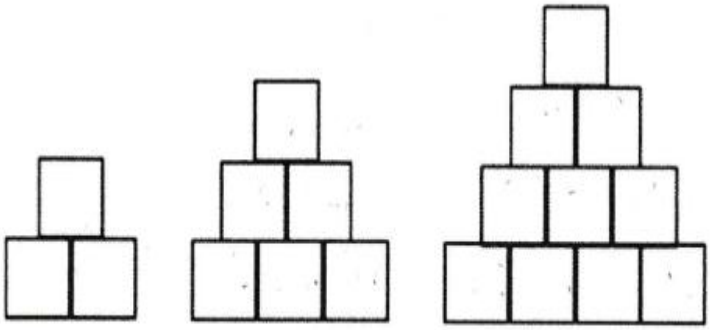
3.2 The first 4 terms of a quadratic sequence are $13 ; x ; 29 ; x + 24 ; \ldots\ldots$
Calculate the value of x. (5)

[19]

KZN MARCH 2017

QUESTION 3

3.1 Peter builds triangular patterns with blocks in his yard, as shown in the sketch.



Pattern 1 Pattern 2 Pattern 3

3.1.1 How many blocks will he need to build the 4^{th} triangular pattern? (2)

3.1.2 Derive a formula to calculate the number of blocks in the n^{th} triangular pattern. (4)

3.1.3 Determine the number of blocks in the 50^{th} triangular pattern. (2)

3.1.4 Which triangular pattern will have 496 blocks? (4)

3.2 The general term of a certain quadratic number pattern is $T_n = 2n^2 - 5$.
Calculate the 50^{th} term of the sequence of first differences of this quadratic number pattern. (4)

[16]

NOV 2017 DOE

QUESTION 3

3.1 Given the finite linear pattern: 12 ; 17 ; 22 ; ... ; 172

3.1.1 Determine a formula for the n^{th} term of the pattern. (2)

3.1.2 Calculate the value of T_{12} . (2)

3.1.3 Determine the number of terms in the pattern. (2)

3.2 Given the first four terms of a linear pattern: 3; x; y ; 30

Calculate the values of x and y . (4)

[10]

QUESTION 4

Given the quadratic pattern: 244 ; 193 ; 148 ; 109 ...

4.1 Write down the next term of the pattern. (2)

4.2 Determine a formula for the n^{th} term of the pattern. (4)

4.3 Which term of the pattern will have a value of 508? (4)

4.4 Between which TWO consecutive terms of the quadratic pattern will the first difference be 453? (3)

4.5 Show that all the terms of the quadratic pattern are positive. (4)

[17]

MARCH 2018 KZN

QUESTION 3

3.1 Consider the following quadratic number pattern: 64 ; 42 ; 24 ; …

3.1.1 Write down the next TWO terms of the number pattern. (2)

3.1.2 Determine an expression for the general term, T_n, in the form $T_n = an^2 + bn + c$. (4)

3.1.3 Calculate the value of the 20th term of this number pattern. (2)

3.1.4 Determine the general term of the sequence of first differences of this number pattern. (2)

3.1.5 Between which two consecutive terms of the quadratic number pattern will the difference be equal to 174? (2)

3.2 If p ; 11 ; 21 ; $6p$ form a quadratic number pattern.
Calculate the value of p. (4)

[16]

JUNE 2018 KZN

QUESTION 4

4.1 Consider the quadratic number pattern: 0 ; –9 ; –16 ; –21 ; –24

4.1.1 Determine the n^{th} term (T_n) of the pattern. (4)

4.1.2 Calculate the 30^{th} term of the pattern. (2)

4.1.3 Determine which term of the pattern will be equal to 200. (4)

JUNE 2018 : (continued):

4.2 The first three figures in a pattern of grey and white squares are shown below.

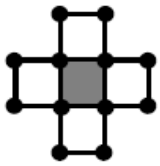


Figure 1

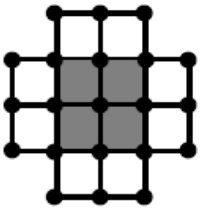


Figure 2

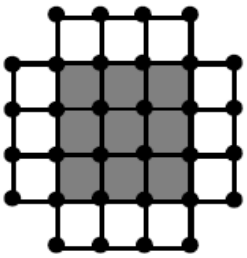


Figure 3

4.2.1 Considering Figure 4 in the pattern, determine:

(a) The number of grey squares in this figure. (1)

(b) The number of white squares in this figure. (1)

(c) The number of dots in this figure. (1)

4.2.2 Considering the n^{th} figure, determine an expression in terms of n for:

(a) The number of grey squares. (1)

(b) The number of white squares. (1)

(c) The number of dots. (2)

4.2.3 There are 320 dots in one of the figures. Determine the number of grey squares in this figure. (5)

[22]

NOV 2018

QUESTION 3

3.1 Given the linear pattern: $7 ; 2 ; -3 ; \ldots$

3.1.1 Determine the general term, T_n, of the linear pattern. (2)

3.1.2 Calculate the value of T_{20}. (2)

3.1.3 Which term in the pattern has a value of -138? (2)

3.2 $6 ; 2x+1$ and $3x-3$ are the first three terms of a linear pattern.

Calculate the value of x. (3)

[9]

QUESTION 4

The quadratic number pattern: $4 ; p ; 11 ; q ; 22 ; \ldots$ has a constant second difference of 1.

4.1 Show that $p=7$ and $q=16$. (3)

4.2 Determine the general term, T_n, of the quadratic pattern. (4)

4.3 Determine the value of n if $T_n = 232$. (4)

4.4 If the sum of two consecutive terms in the pattern is 1 227, calculate the difference between these two terms. (5)

[16]