LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION



VHEMBE EAST DISTRICT

NATIONAL
SENIOR CERTIFICATE

GRADE 11



MATHEMATICS P1
JUNE 2022

MARKS: 100
TIME: 2 hours

This question paper consists of 6 pages

INSRUCTIONS AND INFORMATION

READ THE FOLLOWING INSTRUCTIONS CAREFULLY BEFORE ANSWERING THE QUESTIONS.

1. This question paper consists of 5 questions. Answer ALL the questions.
2. Clearly show ALL calculations, diagrams, graphs, et cetera that you have used in determining the answers.
3. An approved scientific calculator (non-programming and non-graphical) may be used, unless stated otherwise.
4. If necessary, answers should be rounded off to TWO decimal places, unless stated otherwise.
5. Diagrams are NOT necessary drawn to scale.
6. Number the answers correctly according to the numbering system used in this question paper.
7. It is in your own interest to write legibly and to present the work neatly.

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QUESTION 1

1.1. Solve for x in each of the following:

1.1.1. $x^2 + x - 12 = 0$ (3)

1.1.2. $\sqrt{2x+1} = x - 1$ (5)

1.1.3. $2^{x\sqrt{x}} = 2^{27}$ (4)

1.1.4. $x^2 - 2x - 8 < 0$ (3)

1.2. Given: $f(x) = 5x^2 + 6x - 7$

1.2.1. Solve for x if $f(x) = 0$ (correct to TWO decimal places). (4)

1.2.2. Hence, or otherwise, calculate the value of d for which $5x^2 + 6x - d = 0$ has equal roots (3)

1.3. Solve for x and y simultaneously:

$x - 2y = -3$ and $xy = 20$ (6)

[28]

QUESTION 2

2.1. The solution to a quadratic equation is $x = \frac{3 \pm \sqrt{4-8p}}{4}$ where $P \in \mathbf{Q}$.

Determine the value(s) of p such that:

2.1.1. The roots of the equation are equal (2)

2.1.2. The roots of the equation are non-real (2)

2.2. Given: $\sqrt{5-x} = x + 1$

2.2.1. Without solving the equation, show that the solution to the above equation lies in the interval $-1 \leq x \leq 5$. (3)

2.2.2. Solve the equation. (5)

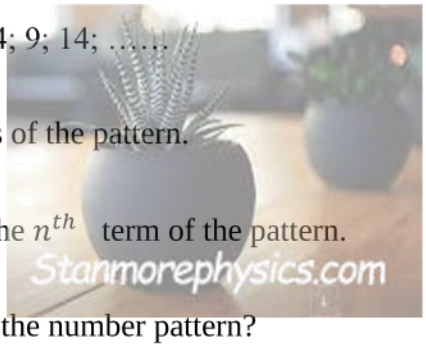
2.2.3. Without any further calculations, solve the equation $-\sqrt{5-x} = x + 1$. (1)

[13]

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QUESTION 3

3.1. Consider the following number pattern: 4; 9; 14; ……



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

3.1.2. Determine the expression for the n^{th} term of the pattern. (2)

3.1.3. Determine if 1099 is a term of the number pattern? (3)

3.2. Consider the following quadratic number pattern: 6; 10; 18; …..

3.2.1. Write down the following two terms of the pattern. (2)

3.2.2. Determine the equation of the general term in the form:

$$T_{n=an^2+bn+c}$$ (4)

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

3.2.4. What term of the pattern will have a value of 766? (4)

3.3. A certain number pattern has the following properties:

- $T_{1=k}$
- $T_{2=14}$
- $T_4 = 7\,T_1$
- $T_3 - T_2 = 10$

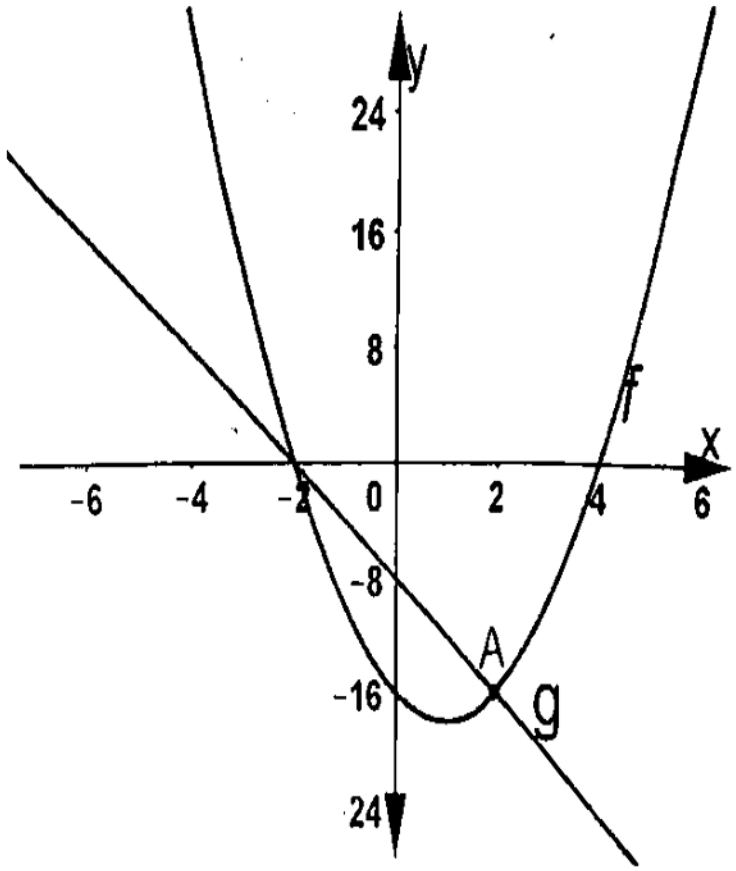


Determine the value of *k*. (5)

[24]

QUESTION 4

The diagram represents the functions $f(x) = ax^2 + bx + c$ and g(x) = $mx + k$



4.1. Calculate the values of a, b and c. (5)

4.2. Find the equation of $g(x)$. (5)

4.3. Calculate the co-ordinates of A, a point of intersection of f and g. (6)

[16]

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QUESTION 5

Given: $f(x) = \frac{-3}{x+2} + 1$ and $g(x) = 2^{-x} - 4$

5.1. Determine $f(-3)$ (2)

5.2. Determine $x\ if\ g(x) = 4$ (3)

5.3. Write down the asymptotes of $f(x)$ (2)

5.4. Write the range of g (1)

5.5. Determine the coordinates of the x and y- intercepts of f (4)

5.6. Sketch the graphs of f and g on the same system of axes. Clearly show ALL the intercepts with the axes and any asymptotes. (4)

5.7. If it is given that $f(-1) = g(-1)$, determine the values of x for which $g(x) \geq f(x)$ (3)

[19]

TOTAL: 100