LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

CAPRICORN SOUTH DISTRICT

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GRADE 12

MATHEMATICS

TEST 1

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MARKS: 100

TIME: 2 Hours

DATE: 12/03/2024

This question paper consists of 6 pages

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

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

QUESTION 1

1.1 Solve for x:

1.1.1 $2 - 3x = x - 6$ (2)

1.1.2 $6x^2 - x - 15 = 0$ (3)

1.1.3 $3x^2 + x - 5 = 0$ (round off your answer to TWO decimal places) (4)

1.1.4 $(x - 1)^2 > 9$ (4)

1.1.5 $\sqrt{2 - 7x} = 2 - x$ (4)

1.2 Solve for x and y if they satisfy the following equations simultaneously:

$x - 2y = 1$

$x^2 - 2xy + y^2 = 9$ (6)

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1.3 Given: $12^{x+1} = 36(6^x)$

1.3.1 Show that the equation can be written in the form: $2^x = 3$ (3)

1.3.2 Solve for x, **correct to two decimal places** (2)

[28]

QUESTION 2

Consider the following number pattern: $6\ ;\ 13\ ;\ 22\ ;\ 33\ ;\ x\ ;\ y$; ……..

2.1 Show that it is a quadratic number pattern (2)

2.2 Write down the values of x and y (2)

2.3 Hence determine the nth term as well as the 160th term (5)

2.4 Determine which term equals 397 (4)

[13]

QUESTION 3

3.1 Given the arithmetic series: $5 + 9 + 13 + ... + 401$

Calculate:

3.1.1 The number of terms in the series (4)

3.1.2 The sum of the terms in the series (3)

3.2 Given the sequence: $2\ ;\ x\ ;\ 18\ ;\ ....$

Calculate x if this sequence is:

3.2.1 An arithmetic sequence (3)

3.2.2 A geometric sequence (4)

3.3 Given: $\sum_{k=1}^{10} 3(2)^{1+k}$

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3.3.1 Write down the first three terms of the series (3)

3.3.2 Determine the sum of the series (3)

[20]

QUESTION 4

Given: $f(x) = \frac{-4}{x-2} - 1$

4.1 Calculate the coordinates of the intercepts of the graph of f with the axes (5)

4.2 Sketch the graph of f, showing the asymptotes and the intercepts with the axes (3)

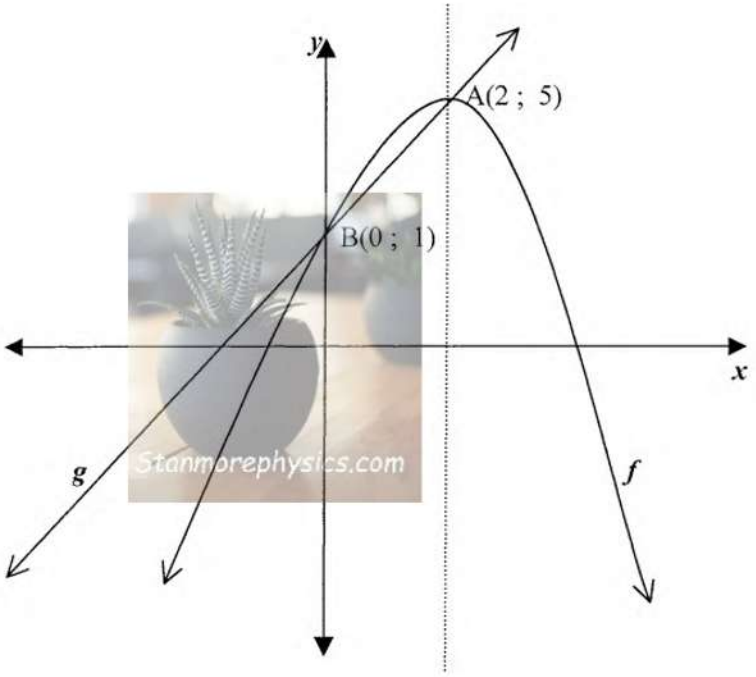
4.3 If the graph of f is shifted five units to the left and two units down, write down the equation of the new function obtained by this transformation. Use the form $y = \ldots..$ (2)

4.4 What is the domain and the range of $f(x)$ (2)

[12]

QUESTION 5

In the diagram below, $A(2\ ;\ 5)$ is the turning point of the parabola f that cuts the y axis at $B(0;1)$. The straight line g passes through A and B.



Determine:

5.1 The equation of g in the form $y = mx + c$ (4)

5.2 The equation of f in the form $y = ax^2 + bx + c$ (4)

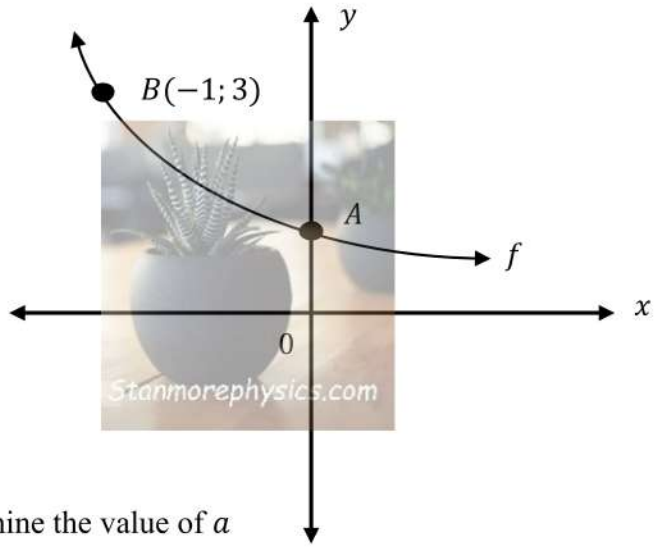
5.3 Determine the length of AB. (leave your answer in simple surd form) (3)

5.4 The values of x for which $f(x) \geq g(x)$ (2)

[13]

QUESTION 6

The sketch below represents the graph of $f(x) = a^x$. The point $B(-1; 3)$ lies on the graph and A is the y intercept of f.



6.1 Determine the value of a (3)

6.2 Determine the coordinates of A (2)

6.3 Determine the equation of f^{-1} the inverse of f, in the form $f^{-1}(x) = \ldots\ldots\ldots$ (2)

6.4 Sketch the graph of f^{-1} (3)

6.5 Determine the domain of f^{-1} (2)

6.6 For which value(s) of x will $f^{-1}(x) \geq -1$ (2)

[14]