LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 11

MATHEMATICS P1
JUNE 2024

MARKS: 100

TIME: 2 Hours

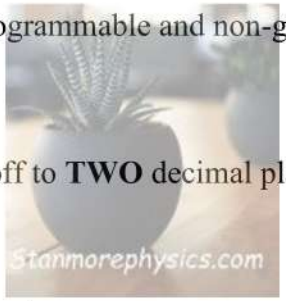
This question paper consists of 6 pages

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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. Number your answers correctly according to the numbering system used in this question paper.
4. Clearly show **ALL** calculations, diagrams and graphs that you have used in determining your answers.
5. Answers only will NOT necessarily be awarded full marks.
6. An approved scientific calculator (non-programmable and non-graphical) may be used, unless stated otherwise.
7. If necessary, answers should be rounded off to **TWO** decimal places, unless stated otherwise.
8. Diagrams are NOT necessarily drawn to scale.
9. Information sheet with formulae is included at the end of the question paper.
10. Write neatly and legibly.



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QUESTION 1

1.1 Solve for x if :

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

1.1.2 $\sqrt{x-1} + 3 = x - 4$ (6)

1.1.3 $x^2 > 3(x + 6)$ (4)

1.1.4 $2^{3x+1} + 2^{3x} = 12$ (4)

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:

$y + x = 2$ and $x^2 + 3xy + 8 = 0$ (6)

[30]

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QUESTION 2

2.1 Simplify WITHOUT using a calculator:

2.1.1 $\dfrac{3^{m+4} - 6.3^{m+1}}{7.3^{m+2}}$ (4)

2.1.2 $\dfrac{2^{n+2}.4^{n+1}}{8^{n-1}}$ (3)

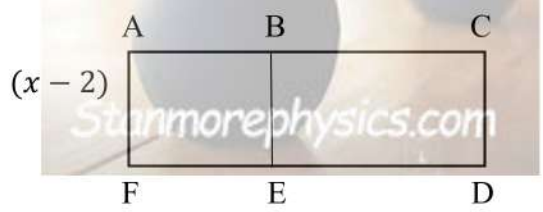
2.1.3 $\sqrt{x + \sqrt{2x-1}}.\sqrt{x - \sqrt{2x-1}}$ (4)

2.2 Calculate the sum of the digits of $2^{2021} \times 5^{2024}$ (4)

[15]

QUESTION 3

ACDF is a rectangle with an area of $(x^2 + 2x - 8)\ cm^2$. B is a point on AC and E is a point on FD such that ABEF is a square with sides of length $(x - 2)$ cm each.



Calculate the length of ED. (5)

[5]

QUESTION 4

Given: $f(x) = \frac{8}{x-2} + 3$

4.1 Write down the equations of the asymptotes of f. (2)

4.2 Calculate the x- and y- intercepts of f. (3)

4.3 Sketch the graph of f. Show clearly the intercepts with the axes and the asymptotes. (3)

4.4 If $y = x + k$ is an equation of the line of symmetry of f, calculate the value of k (2)

4.5 The graph of f is reflected about the x-axis to obtain the graph of g. Write down the equation of g. (2)

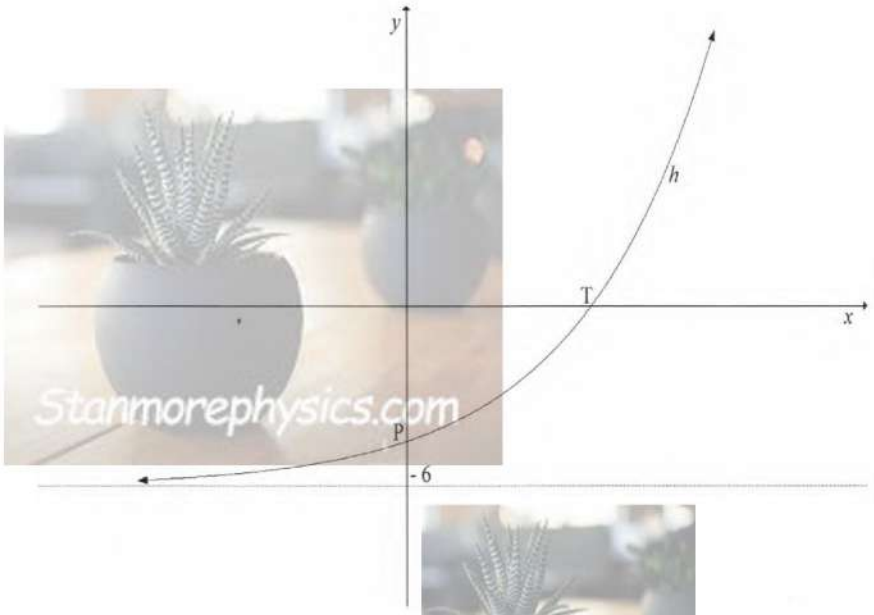
4.6 Write down the domain of f. (2)

[14]

QUESTION 5

Given: $h(x) = a.2^{x-1} + q$. The line $y = -6$ is an asymptote to the graph of h.

P is the y-intercept of h and T is the x-intercept of h.



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5.1 Write down the value of q. (1)

5.2 If the graph of h passes through the point $(-1; -5\frac{1}{4})$, calculate the value of a. (4)

5.3 Calculate the average gradient between the x-intercept and the y-intercept of h. (5)

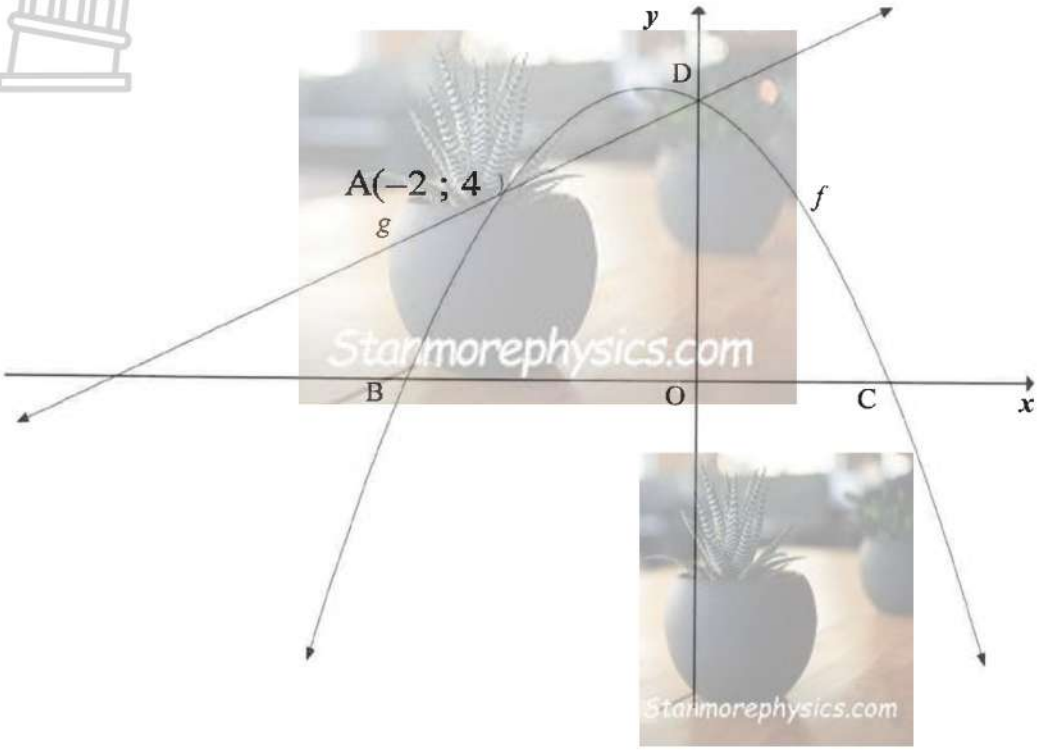
5.4 Determine the equation of g if $g(x) = h(x-2)$ in the form $g(x) = a.2^{x-1} + q$ (2)

5.5 Write down the range of h. (2)

[14]

QUESTION 6

The diagram below shows the graphs of $f(x) = -x^2 - x + 6$ and $g(x) = mx + c$.
$A(-2; 4)$ is the point of intersection of the graphs.



6.1 Determine the coordinates of B and C. (4)

6.2 Write down the equation of the axis of symmetry of f. (2)

6.3 Determine the range of f (3)

6.4 Write down the equation of g in the form $g(x) = mx + c$. (3)

6.5 Calculate the average gradient between point A and D (1)

6.6 Determine the equation of h, if h is the reflection of f about the x-axis and then translated 3 units to the right. Leave your answer in the form $f(x) = a(x + p)^2 + q$ (3)

6.7 Write down the values of x for which:

6.7.1 $f(x) < 0$ (2)

6.7.2 $f(x) \geq g(x)$ (2)

6.8 If $f(x) = k$, write down the value(s) of k for which the equation has equal roots. (2)

[22]

TOTAL : 100

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