Province of the
EASTERN CAPE
EDUCATION

Iphondo leMpuma Kapa: Isebe leMfundo
Provinsie van die Oos Kaap: Departement van Onderwys
Porofensie Ya Kapa Botjhabela: Lefapha la Thuto

NATIONAL SENIOR CERTIFICATE

BUFFALO CITY METRO DISTRICT

GRADE 10

MATHEMATICS TEST

21-08-2025

MARKS : 50
Time : 1 Hour

This question paper consists of 6 pages with diagram sheet.

INSTRUCTIONS AND INFORMATION:

Read the following instructions carefully before answering the questions.

1. This paper consists of **FOUR QUESTIONS**.
2. Answer **ALL** the questions.
3. Clearly show ALL calculations, diagrams, graphs, etc. that you have used in determining your answers.
4. Answers only will **NOT** necessarily be awarded full marks.
5. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
6. If necessary, round answers off to **TWO** decimal places, unless stated otherwise.
7. Diagrams are **NOT** necessarily drawn to scale.
8. Write neatly and legibly.

QUESTION 1

Given the equation: $h(x) = \frac{-2}{x} + 2$

1.1 Determine the x-intercept of h. (2)

1.2 Calculate the y-intercept of h. (2)

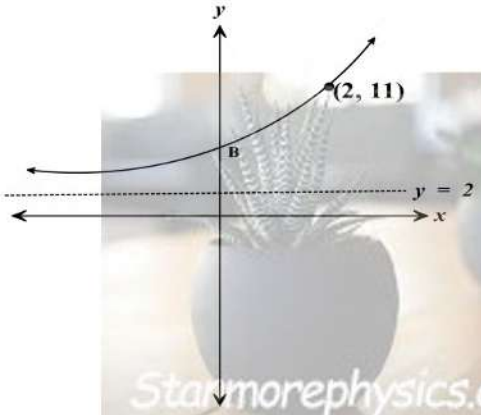
1.3 Write down the equation of asymptotes of h. (2)

1.4 Hence, sketch the graph of h. Clearly show all intercepts with the axes and asymptotes. (3)

[9]

QUESTION 2

The graph of $f(x) = a^x + b$ is drawn below. B is the y intercept of f.



Use the above graph to answer the following questions:

2.1 Write down the equation of asymptote of f. (1)

2.2 Determine the values of a and b. (3)

2.3 Write down the range of f. (1)

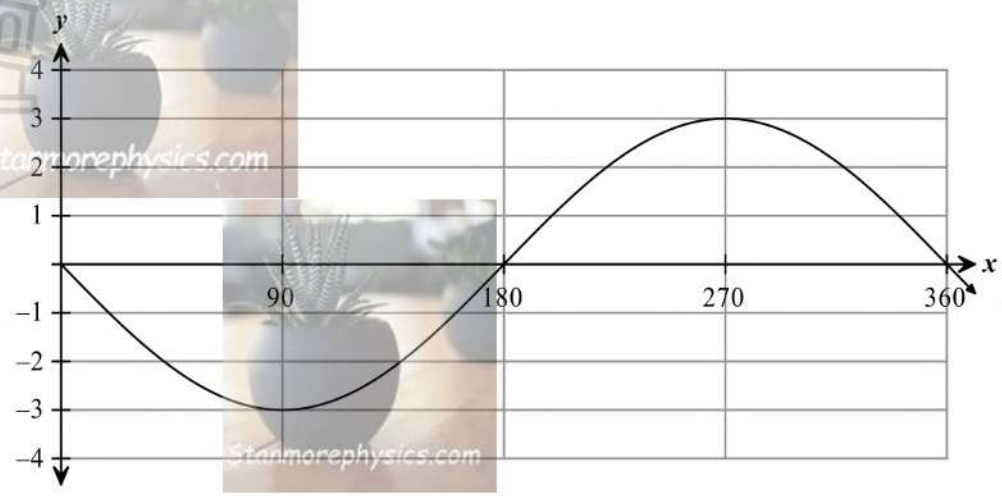
2.4 Determine the coordinates of B. show all your workings. (2)

2.5 Determine the equation of t, if $t(x) = 3f(x) - 1$. (3)

[10]

QUESTION 3

In the diagram below, the graph of $f(x) = -3sinx$ is drawn for the interval of $0° \leq x \leq 360°$



3.1 Write down the amplitude of f. (1)

3.2 Write down the minimum value of $f(x) + 5$ (1)

3.3 One the same set of axes, draw the graph of p, $p(x) = tanx$ for the interval $0° \leq x \leq 360°$ (3)

3.4 Use the graph to determine the following:

3.4.1 The value of $f(90°) - p(180°)$ (3)

3.4.2 Determine the equations of asymptotes of p. (2)

3.4.3 For which values of x is $p(x) \leq 0$ (4)

3.5 The graph of f is reflected about x-axis and then moved 2 units upwards to form the graph of k. Determine:

3.5.1 The equation of k. (2)

3.5.2 The range of k for the interval $0° \leq x \leq 360°$ (2)

[18]

QUESTION 4

4.1 Given the equation of $r(x) = 2cosx - 1$

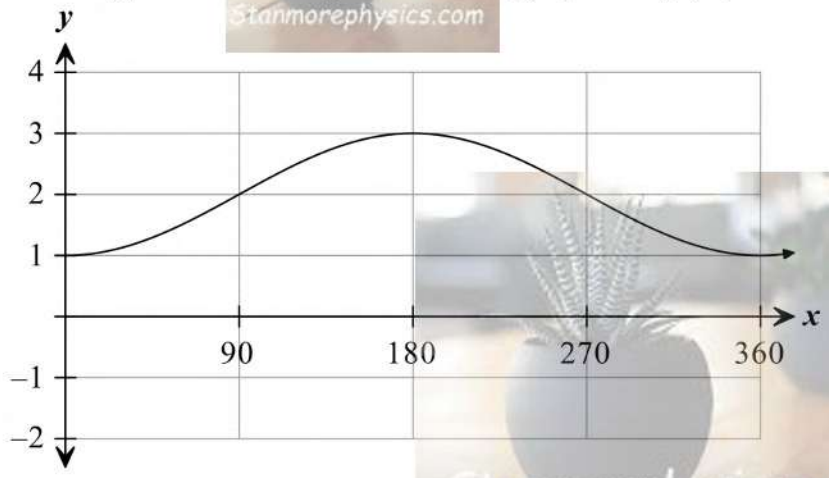
4.1.1 Sketch the graph of r on the provided grid, for $x \in [0°; 360°]$ (3)

4.1.2 Write down the period of r. (1)

4.1.3 Determine the maximum value of r. (1)

4.1.4 Determine the range of r. (2)

4.2 The diagram below represents the graphs of $f(x) = acosx + q$



4.2.1 Write down the values of a and q. (2)

4.2.2 Using the graph for which values of x is f a decreasing function. (1)

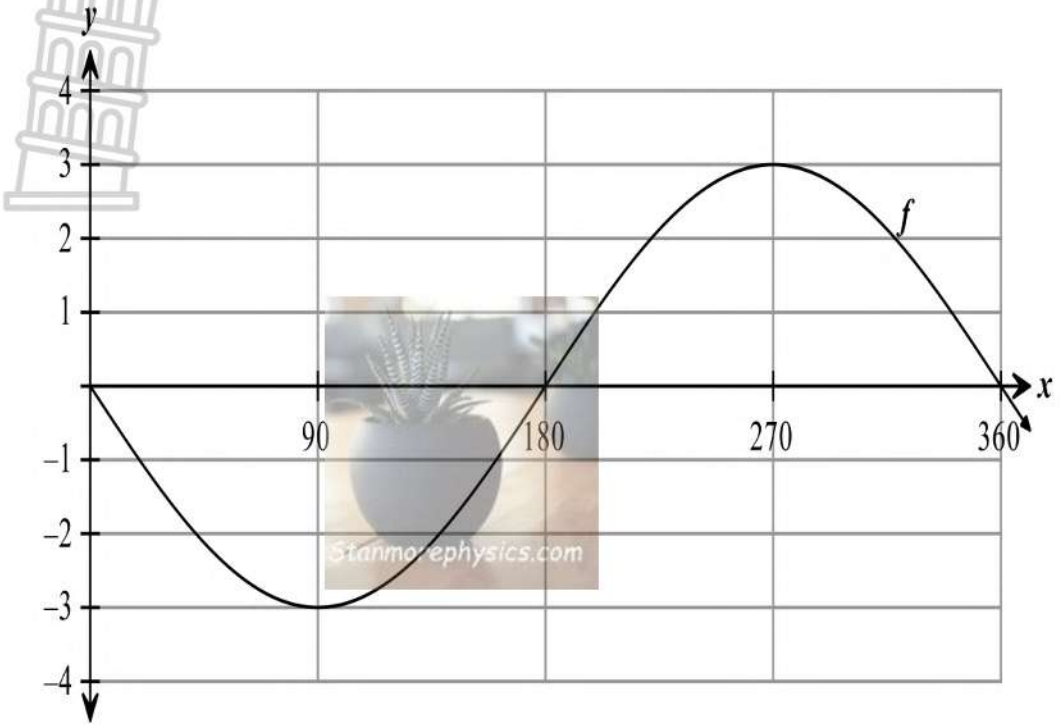
4.2.3 For which values of x is $f(x) \geq 2$ (2)

4.2.4 Write down the minimum value of f, if f is shifted 3 units downwards. (1)

[13]

LEARNER NAME:

QUESTION 3.3



QUESTION 4.1.1

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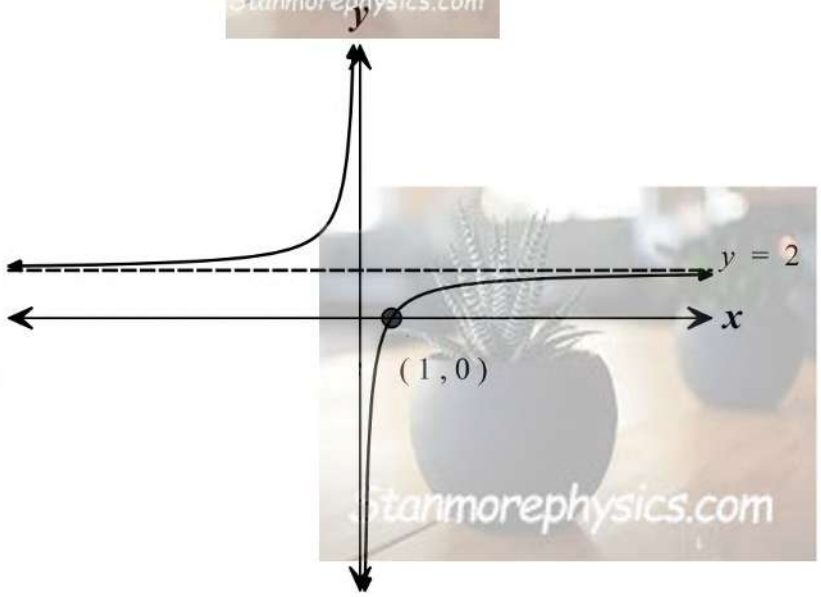
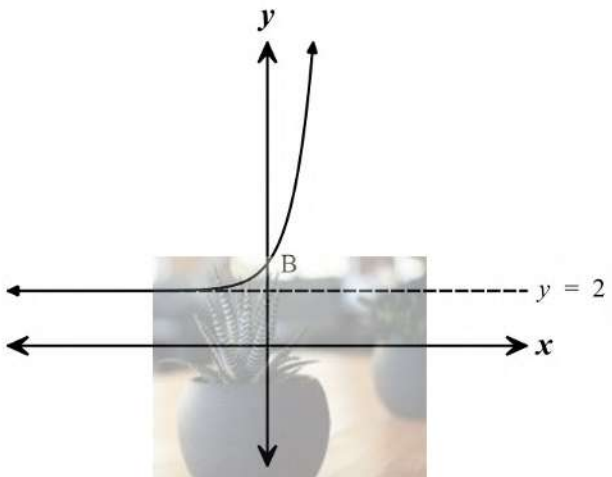
MATHEMATICS TEST

MARKING GUIDELINES

MARKS : 50
Time : 1 Hour

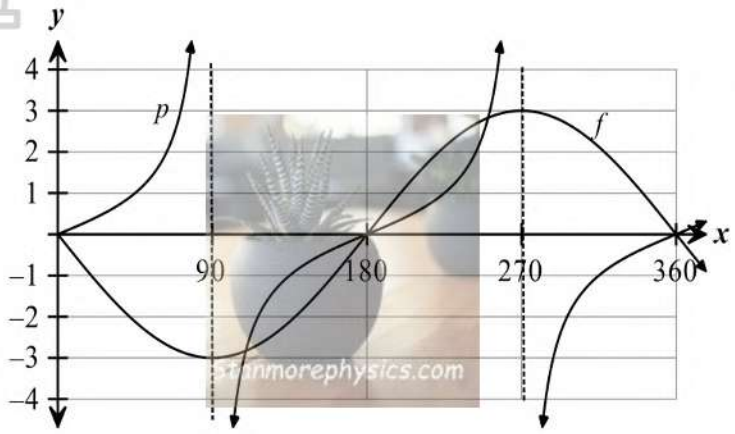
QUESTION 1			
1.1	x-intercept ($y = 0$) $0 = \frac{-2}{x} + 2$ $-2 = \frac{-2}{x}$ $-2x = -2$ $x = 1$	$y = 0$ ✓ $x = 1$ ✓	(2)
1.2	*y intercept (x = 0)* $y = \frac{-2}{0} + 2$ (undefined) ∴ There is no y intercept	$x = 0$ ✓ *Conclusion* ✓	(2)
1.3	$x = 0$ $y = 2$	$x = 0$ ✓ $y = 2$ ✓	(2)
1.4		Shape ✓ x-intercept ✓ Asymptote ✓	(3)
			[9]

QUESTION 2

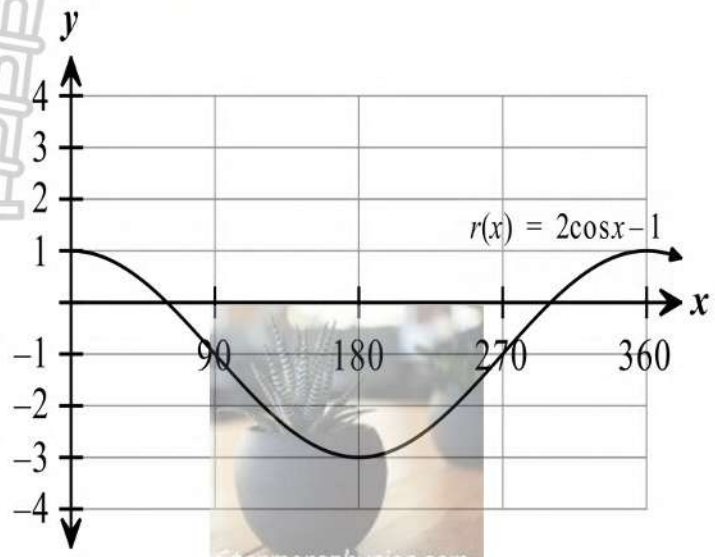
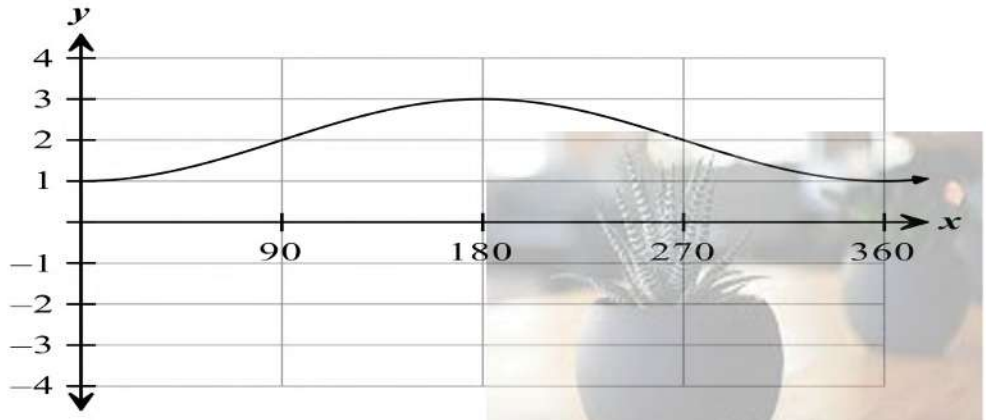


2.1	$y = 2$	$y = 2$✓	(1)
2.2	b = 2 $f(x) = a^x + 2$ at point (2;11) $11 = a^2 + 2$ $9 = a^2$ $\sqrt{9} = \sqrt{a^2}$ $a = \pm 3, a = 3$	$b = 2$ ✓ Substitution ✓ $a = 3$ ✓	(3)
2.3	$y \in \mathbb{R}, y > 2$ OR $y \in (2; \infty)$ **ACCEPT**: $y > 2$	Answer ✓✓	(2)
2.4	Since B is the y intercept ($x = 0$) $y = 3^0 + 2$ $y = 3$ $\therefore B(0;3)$	$x = 0$✓ $y = 3$✓	(2)
2.5	$t(x) = 3f(x) - 1$ $t(x) = 3(3^x + 2) - 1$ $t(x) = 3.3^x + 6 - 1$ $t(x) = 3^{x+1} + 5$	$3(3^x + 2) - 1$✓ Simplification ✓ $3^{x+1} + 5$ ✓	(3)
			[10]

QUESTION 3

3.1	Amplitude = 3	3 ✓	(1)
3.2	Minimum value = $-3+5$ Minimum value = 2	2✓	(1)
3.3		Shape ✓ Asymptotes ✓ All intercepts ✓	(3)
3.4.1	$f(90°) - p(180°)$ $= -3 - 0$ $= -3$ **NOTE**: Learner is required to use graph not Algebraically!	-3 ✓ 0✓ -3✓	(3)
3.4.2	$x = 90°$ $x = 270°$	$x = 90°$✓ $x = 270°$✓	(2)
3.4.3	$90° < x \leq 180°$ OR $x \in (90°; 180°]$ $270° < x \leq 360$ **OR** $x\epsilon(270°; 360°]$ **NOTE**: Correct notation 90° and 270° must be excluded on the solution of a learner	$90° < x \leq 180°$ ✓✓ $270° < x \leq 360$ ✓✓	(4)
3.5.1	f(x) = -3sinx reflect f on x axis -y = $-3\sin x$ y = $3sinx$ moving 2 units upwards k(x)= 3sinx +2	3sin (x) + 2 ✓✓	(2)
3.5.2	$-1 \leq y \leq 5$ OR $y \in [-1; 5]$ **INCORRECT NOTATION: 0 MARKS**	Answer ✓✓	(2)
			[18]

QUESTION 4

4.1.1		Shape ✓ Turning point ✓ y-intercept ✓	(3)
4.1.2	Period = 360°	Answer ✓	(1)
4.1.3	Maximum value = 1	Answer ✓	(1)
4.1.4	$-3 \leq y \leq 1 \quad OR\ y \in [-3; 1]$	Answer ✓✓	(2)
4.2			
4.2.1	$a = -1$ $q = 2$	$a = -1$ ✓ $q = 2$ ✓	(2)
4.2.2	$180° \leq x \leq 360°$ **ACCEPT**: $180° < x < 360°$	Answer ✓	(1)
4.2.3	$90° \leq x \leq 270°$	Answer ✓✓	(2)
4.2.4	Minimum value = $1 - 3 = -2$	-2 ✓	(1)
			[13]