Province of the
EASTERN CAPE
EDUCATION

OR TAMBO INLAND DISTRICT

NATIONAL SENIOR CERTIFICATE

AUGUST TEST

GRADE 11

Stanmorephysics.com

MATHEMATICS

MARKS: **50**

TIME: **1 Hour**

This question paper consists of pages, including FORMULA SHEET

Grade 11

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of THREE questions.

2. Answer ALL the questions.

3. Clearly show ALL calculations, diagrams, graphs, et cetera that you have used in determine your answers.

4. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.

5. Answers only will NOT necessarily be awarded full marks.

6. If necessary, round off answers to TWO decimal places, unless stated otherwise.

7. Diagrams are NOT necessarily drawn to scale.

8. Number the answers correctly according to the numbering system used in this question paper.

9. Write neatly and legibly.

QUESTION 1

Consider the function defined by: $f(x)=\frac{2}{x+1}-3$

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

1.2 Write down the equations of the axis of symmetry of f. (4)

1.3 The coordinates of the y – intercept of f. (2)

1.4 The coordinates of the x – intercept of f. (3)

1.5 Write $g(x)$ a function resulting from the reflection of f about the x – axis. (3)

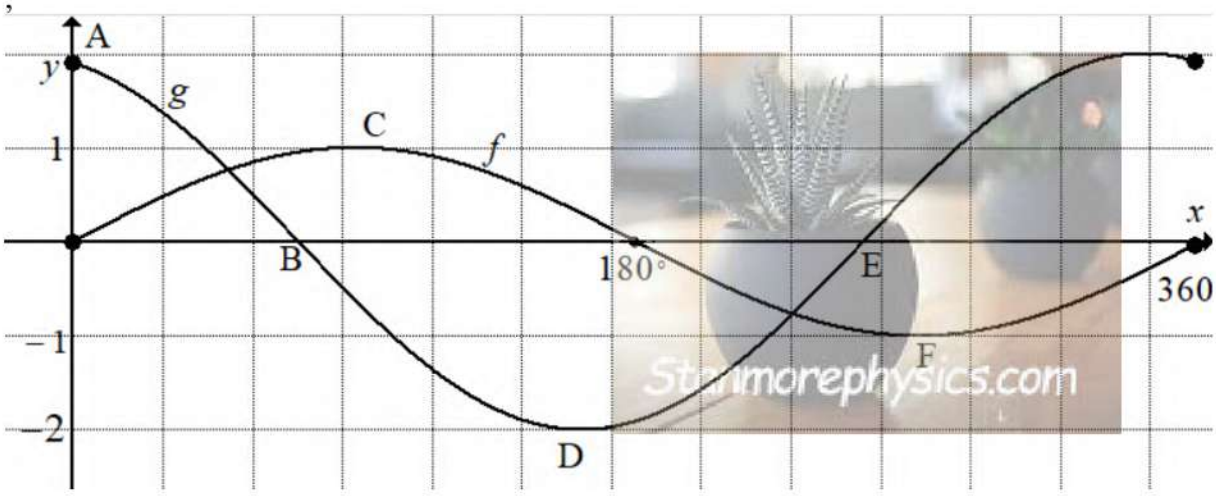
1.6 Sketch the graph of f in the DIAGRAM SHEET provided at the end of the question paper. Label all your intercepts, asymptotes and axis of symmetry of the graph. (4)

[18]

QUESTION 2

The sketches below represent the graphs of functions defined by: $f(x) = a \sin(bx)$ and $g(x) = -2\cos(x + 60°)$

;



Determine:

2.1 the value of $g(69{,}3°)$ (2)

2.2 the coordinates of A, the y – intercept of g. (2)

2.3 the value of a in the graph of f. (1)

2.4 the period of g. (1)

2.5 the coordinates of D, the turning point of g. (2)

2.6 Determine the values of x, in the given domain, for which $g(x) < 0$ (4)

2.7 Determine the value of Amplitude of $g(x)$ – Amplitude of $f(x)$ (3)

2.8 A new function $h(x)$ results for $g(x)$ reflecting about the x axis and shifting 60° to the right. Write down the function h. (3)

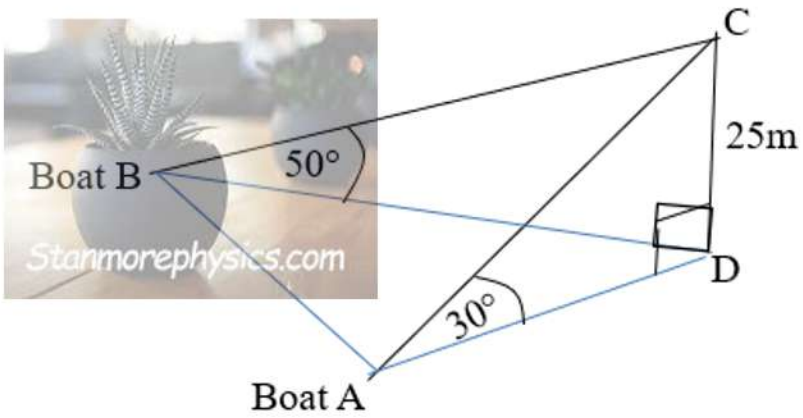
[18]

QUESTION 3

A large fishing ship got stuck along PSJ coast. For a week 2 small boats A and B have been pulling the sheep to no success.



The angle of elevation from A and B are 30° and 50°, respectively. The following is a model showing the 25 meter high fishing ship:



3.1 Write down the size of $B\hat{C}D$. (1)

3.2 Calculate the length of BC. (3)

3.3 Determine the length of AB if ΔABC is isosceles and $A\hat{C}B = 25°$. (5)

3.4 Determine the area of ABD. (5)

[14]

TOTAL: 50

Grade 11

SURNAME: _____ **NAME:** _____

SCHOOL: _____ **GRADE:** _____

QUESTION 1.5

DIAGRAM SHEET



Grade 11

INFORMATION SHEET

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$A = P(1+in) \qquad A = P(1-in) \qquad A = P(1-i)^n \qquad A = P(1+i)^n$$

$$T_n = a + (n-1)d \qquad S_n = \frac{n}{2}[2a + (n-1)d] \qquad i_{eff} = \left(1 + \frac{i}{m}\right)^m - 1$$

$$T_n = ar^{n-1} \qquad S_n = \frac{a(r^n - 1)}{r-1};\ r \neq 1 \qquad S_\infty = \frac{a}{1-r}\ ;\ -1 < r < 1$$

$$F = \frac{x[(1+i)^n - 1]}{i} \qquad P = \frac{x[1-(1+i)^{-n}]}{i}$$

$$f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \qquad M\left(\frac{x_1 + x_2}{2}; \frac{y_1 + y_2}{2}\right)$$

$$y = mx + c \qquad y - y_1 = m(x - x_1) \qquad m = \frac{y_2 - y_1}{x_2 - x_1} \qquad m = \tan\theta$$

$$(x-a)^2 + (y-b)^2 = r^2$$

In ΔABC:

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc.\cos A$$

$$\text{Area } \Delta ABC = \frac{1}{2}ab.\sin C$$

$$\sin(\alpha + \beta) = \sin\alpha.\cos\beta + \cos\alpha.\sin\beta \qquad \sin(\alpha - \beta) = \sin\alpha.\cos\beta - \cos\alpha.\sin\beta$$

$$\cos(\alpha + \beta) = \cos\alpha.\cos\beta - \sin\alpha.\sin\beta \qquad \cos(\alpha - \beta) = \cos\alpha.\cos\beta + \sin\alpha.\sin\beta$$

$$\cos 2\alpha = \begin{cases} cos^2\alpha - sin^2\alpha \\ 1 - 2sin^2\alpha \\ 2cos^2\alpha - 1 \end{cases} \qquad \sin 2\alpha = 2\sin\alpha.\cos\alpha$$

$$\bar{x} = \frac{\sum x}{n} \qquad \sigma^2 = \frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n}$$

$$P(A) = \frac{n(A)}{n(S)} \qquad P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

$$\hat{y} = a + bx \qquad b = \frac{\sum(x - \bar{x})(y - \bar{y})}{\sum(x - \bar{x})^2}$$