MINISTRY OF EDUCATION AND HIGHER EDUCATION

GRADE 12 EXAMS, 2006

MATHEMATICS

2006

P/LAND NATIONAL EXAMINATION BOARD

Name .....

School .....

Roll Number.....

Puntland State of Somalia

Ministry of Education

Puntland National Examination Board

Form 4 MATHEMATICS Examination

2006

Time 2 hours

Plus 10 minutes before the exam for reading through the paper

TOTAL TIME 2 hours 10 minutes

INSTRUCTIONS TO CANDIDATES

This paper consists of 14 printed pages.
Count them now. Inform the invigilator if there are any missing.

PART ONE (10 Multiple choice questions):	**10 marks**
PART TWO (Structured questions):	**90 marks**
TOTAL	**100 marks**

- **Answer ALL questions.**
- **All answers and working must be written on this paper in the spaces provided immediately after each question.**
- **Rough work can be done on page 2. This will not be marked**
- **No extra paper is allowed.**
- **No calculators are allowed.**
- **If you make a mistake cross out the incorrect answer clearly and write your correct answer.**

Use this page for rough work, it will not be marked

PART ONE Multiple Choice questions

10 questions, 1 mark each question

For each question in this section , circle the correct answer, either A or B or C or D
eg. (A)

If you change your mind cross out the answer you have wrongly chosen and clearly circle the correct answer.

If the examiners think you have marked two answers you will not receive a mark for that question. **For each question there is only one correct answer.**

1. 2006.078 km is equal to

A 2 006 078 m B 20 060 078 cm

C 20 060 780 mm D 20 060 780 000 ml

2. $\log_2 1024$ =

A 8 B 10

C 2048 D 512

3. $\sqrt[4]{81}$ is equal to

A 20.25 B $4\sqrt{81}$

C 3 D 9

4. The LCM of $4x^2$, $8x$, $6x^3$ is

A $2x$ B $24\,x^3$

C $48\,x^3$ D $192\,x^3$

5. The value of $4.1 \times 10^{-33} \times 2.5 \times 10^{22}$ in standard form is

A $-10^{11} \times 10.25$ B 10.25×10^{-11}

C 1.025×10^{-55} D 1.025×10^{-10}

6. ${}^4C_3$ is equal to

A 4 B 12

C 4/3 D 3

7. **d/dx** (-sinx) is:

A cosx B $\sin^2 x$

C – cos x D $\tan^2 x$

8. $\int 1 + 2x + 3x^2 - \frac{1}{3}x^3\, dx$ is equal to

A $0 + 2 + 6x - x^2 + c$ B $-x - x^2 - x^3 + x^4/12 + c$

C $0 - 2 - 6x + x^2 + c$ D $x + x^2 + x^3 - x^4/12 + c$

9. **f(b)** = $(-b)^5 - \frac{3}{8}b + b^{-1}$ the value of **f(–2)** is equal to

A $-34\frac{3}{8}$ b B $(-2b)^5$

C $-31\frac{3}{4}$ D 0

10. cos 2A is equal to

A cos A + cos A B $\cos^2 A - \sin^2 A$

C $2\cos^2 A$ D 2 sinA cos A

PART TWO Structured Questions

Total 90 Marks **ANSWER ALL QUESTIONS** **(2) marks means 2 marks.**

π = 3.14 or 22/7

Question 11

(a) 12 women all working at the same speed do some typing in 5 days, how many days would it take only 7 women?

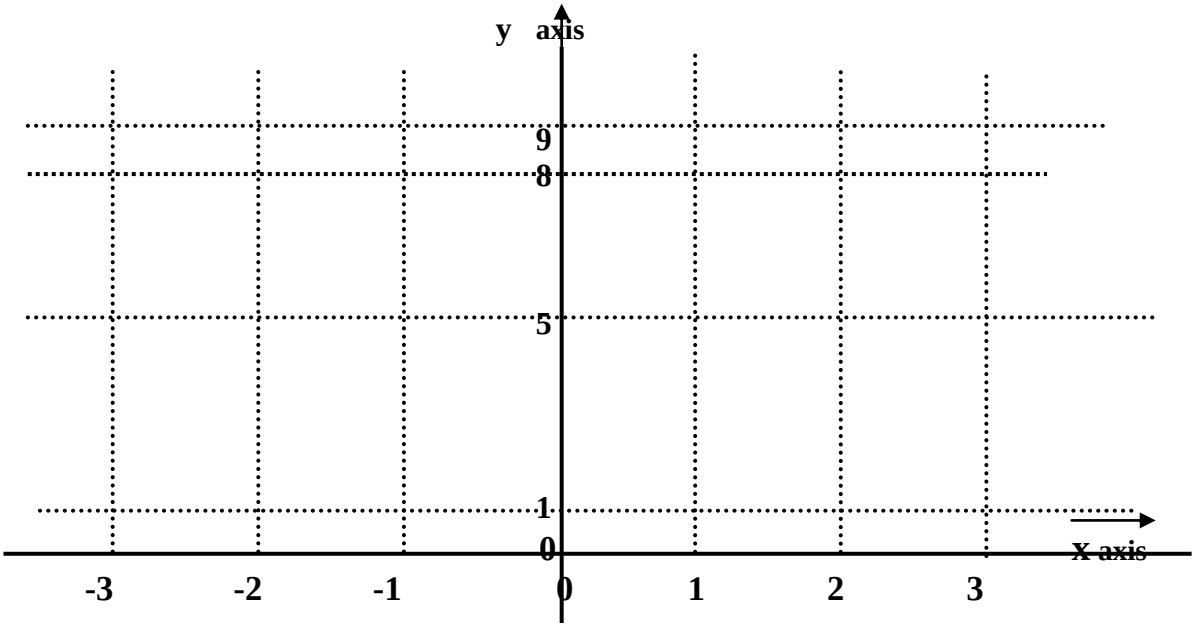
……days (2)

(b)
Zara has $x and Ali has $700, if the ratio of their money is 9: 5 how much has Ali?

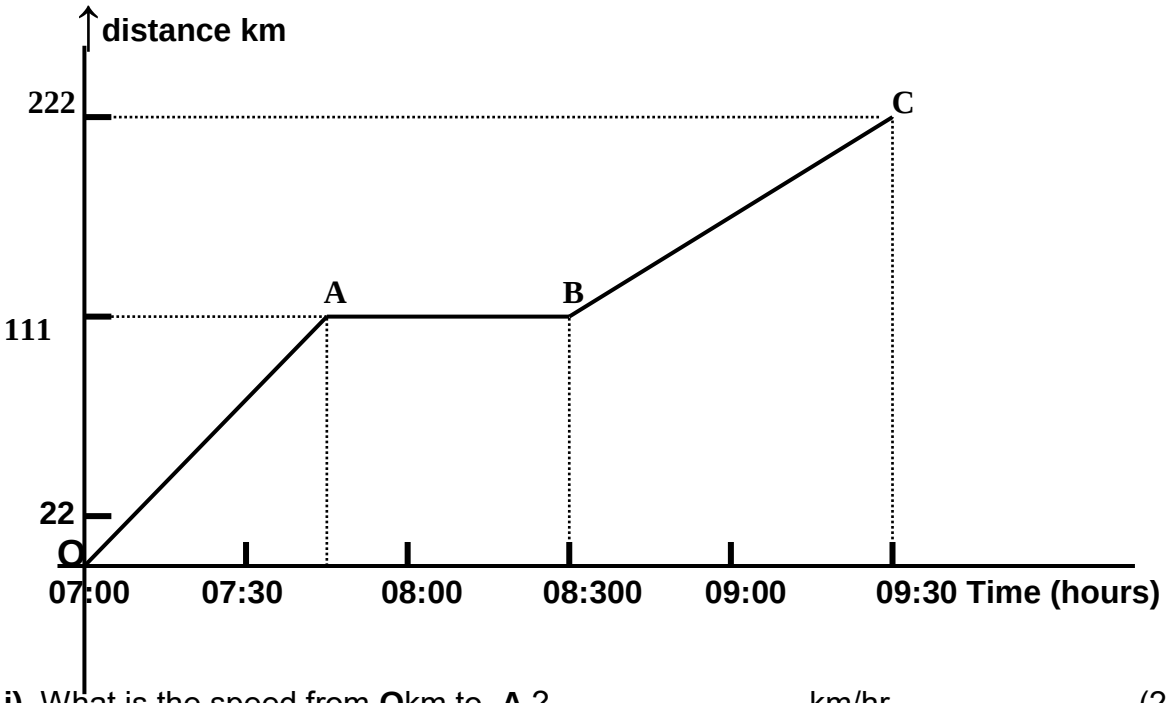
Alli has $.....(2)

(c) The Universal set is {3,4,5,6,7,8} then the complement of { 3, 4,5} is:
{ ……} (1)

(d) SKETCH the curved graph of $y = -x^2 + 9$ from x =`–3 to x = + 3 (3)



11(e) The distance –time graph represents Mohamed's journey from Garoe to Gardo .



i) What is the speed from **O**km to **A** ? **……...**km/hr (2)

ii) What is the speed from **A** to **B**?.....km/hr (1)

iii) What is the speed from **B** to **C** …… …….. km/hr (1)

iv) What happens on the journey between A and B?

.....

……..(2)

Question 12 Solve for **x** $2x^2 - 5x - 3 = 0$

X = …… and x = …….. (3)

Question 13. a)

Find the sum of 20 terms of the Geometric Progression, -2, -4, -8, -16,

(2^{20} = 1 048 576) **$S = a(1 - r^n) / (1 - r)$** (4)

Sum = ……

13(b)
You have 4,950,000 Somalia shillings and you change it to X dollars at a rate of 15,000/- =$1. Calculate X:

X = $..... (1)

With your X dollars you fly to Kenya for a week where you change **only** $300 of your X dollars to Y Kenyan shillings ($1 = 75Ksh).

Y = Ksh…….(1)

You then spend 20,940/- Ksh.

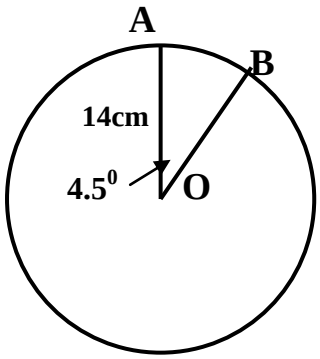
At the end of the week when you wish to return home you change what you have left over of your Kenyan shillings back into dollars
at $1 = 78Ksh $1.

How many dollars in total remain from your X dollars? Ans……(3)

Question 14 (a) Vectors **a** and **b** are drawn for you

Draw the single vector $-\underline{a} + 3\underline{b}$ **below** (3)

Question 14 (b) . Angle AOB = 4.5^0 Radius of circle =14cm
Find **(i)** the area of the minor sector AOB



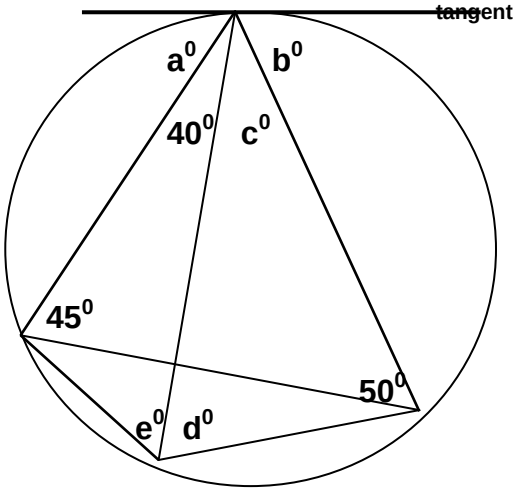
(i) Area = ……cm^2 (3)_

(ii) The length of the arc AB

(ii) Length of arc = ……..cm (2)

Question 15

Find a^0, b^0, c^0, e^0 and d^0 (5)



c^0 =

d^0 =

e^0 =

a^0 =

b^0 =

Question 16

Matrices $C = \begin{bmatrix} 3 & 4 \\ 2 & 3 \end{bmatrix}$ $D = \begin{bmatrix} 1 & -2 \\ 3 & 1 \end{bmatrix}$

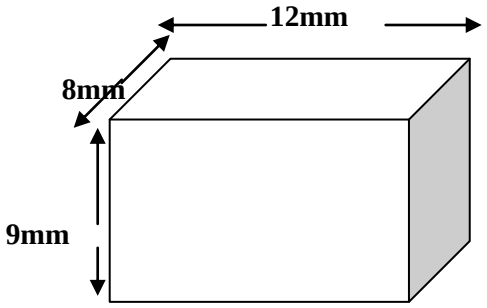
Calculate (i) C^{-1}, the inverse of **A** (3)

(ii) CD **(C multiplied by D)** (3)

(iii) Calculate $-\frac{1}{2}C - 2D =$ (3)

Question 17 .

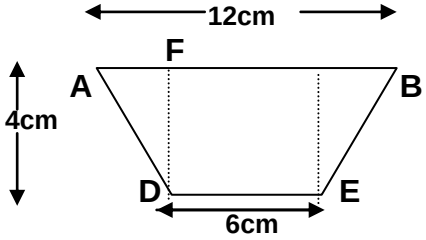
(a) Find the surface area of the rectangular block, whose length is 12mm, width 8mm and height 9mm.



Ans……mm^2 (3)

(b). For the isosceles trapezium below

Find the length of (i) AF (ii) BE (iii) the area of the trapezium



Ans…AF…… cm (1)

Ans…BE…… cm (3)

Ans Area ……cm^2 (3)

Question 18

(a) Calculate the size of an interior angle of a regular hexagon.

Ans……^{0} (2)

(b) Convert 135 ^{0} to π radians.

Leave as a fraction Ans……^{c} (2)

(c) Solve the trigonometric equation $\sec^2 A + \tan^2 xA = 3$ $\mathbf{0^0 \leq A \leq \pm 90^0}$

(Use $\sec^2 A = 1 + \tan^2 A$, $\tan 45^0 = 1$, and let x = tanA)

Ans A = ^{0} (3)

(d) A velocity- time graph can be written as $\mathbf{v = t^2 - 5t}$. where **v** is the velocity is m/s and **t** is the time in seconds**.**

(i) If ***dv/dt*** is the acceleration, find the acceleration at t = 4 seconds

Acceleration = ……(3)

Question 18 (d) contd

(ii) If the $\int$ **v** ***dt*** = distance **s,** find the distance **s** gone from **t** = 1 sec to **t** = 3 seconds

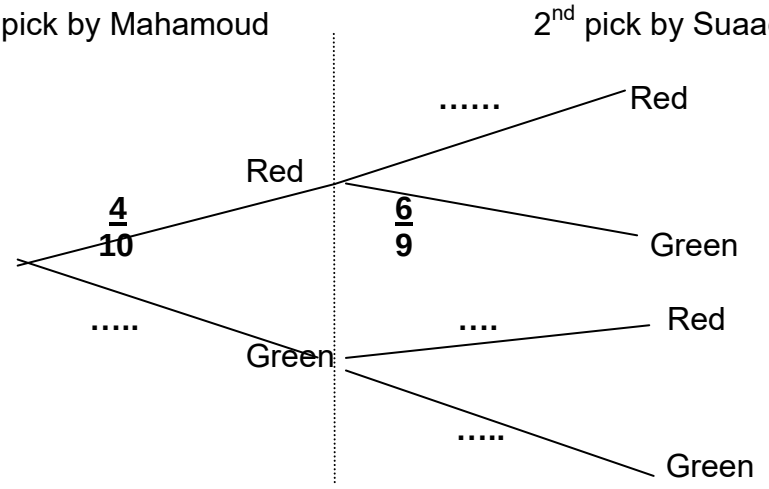
s = …….m (4)

Question 19

(a) Find the (i) mean (ii) median and (iii) mode of -1, 9, 3,-5, 3, 5,7

(i) mean =…….. (1)
(ii) mode = ……(1)
(iii) median =……(1)

(**b)** A bag contains 4 Red and 6 Green sweets.
Mahamoud picks one sweet and eats it. Then Suaada picks a sweet out of the same bag and eats it.
The tree diagram shows the probabilities of picking a Red or a Green sweet.
Complete the 4 missing fractions on the tree diagram:



(2)

Calculate the probability that: (i) the two sweets eaten will not be Red.

Ans …… (2)

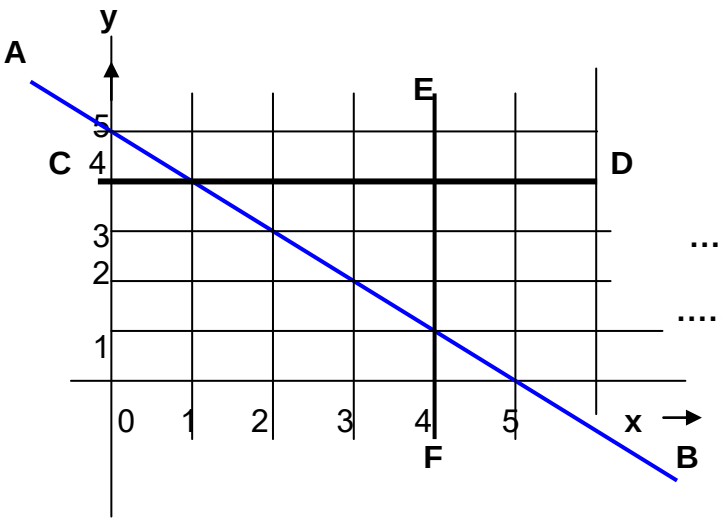
19 (b) (ii) The two sweets eaten will both be of the same colour. (3

19 (c) **(i)** Write down the equation of the line **AB** below

…… (2)

(ii) Write down all the integer coordinates on the graph such that

$0 < y < 5$ and $0 \leq x \leq 5$



…….

…….

……. (3)

(iii) Write down the equation of the line **CD**

……. (2)

(iv) Write down the equation of the line **EF**

……. (2)