MINISTRY OF EDUCATION AND HIGHER EDUCATION

FORM FOUR EXAMS, 2015

MATHEMATICS

2015

P/LAND NATIONAL EXAMINATION BOARD

MINISTRY OF EDUCATION AND HIGHER EDUCATION
PUNTLAND NATIONAL EXAMINATIONS BOARD

Code Number ____

FORM FOUR EXAMINATIONS 2015
Time 2 hours AND 10 minutes for reading

MATHEMATICS

Instructions to candidates

- Answer all the questions
- This paper consists of 15 pages, count it and if any is missing inform your invigilator
- Do not write your **name and roll number** on the exam paper
- Make sure that **student's profile** is attached to the exam paper, if not, inform you invigilator.
- No extra paper is allowed. Rough work can be done on page 2. This will not be marked
- If you make a mistake, **cross out the incorrect** answer and **write your correct answer.**

This exam paper consists of the following parts

- PART A: (10 multiple choices) = 10 marks
- PART B: (11 structured questions) = 80 marks
- PART C: (Choose ANY 2 of the 4 questions) = 10 marks

TOTAL 100 marks

For the marker only

Parts	**Marks**
Part one	
Part two	
Part three	
Total	**%**

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

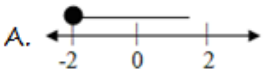
PART ONE: Multiple choice (Circle the correct answer ONLY). Each question carries 1 mark

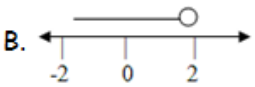
1. ${}^5C_2$ is equal to
   A. 20
   B. 10
   C. 40
   D. 50

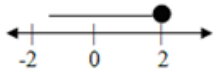
2. Two fair dice are rolled .The probability that the sum on two dice is one is :
   A. 0
   B. 1
   C. ½
   D. ¼

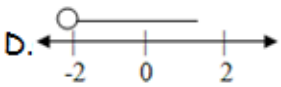
3. Matrix A has NO inverse if its
   A. Order is 3X3
   B. Order is 2X2
   C. Determinant is zero
   D. Determinant is -1

4. Which of the following represents the solution set of $5 - x \geq 1 - 3x$

A. 

B. 

C. 

D. 

5. The common factor of $32x^2 - 8x + 4xy$ is
   A. 8x
   B. 4xy
   C. 4
   D. 4x

6. If log2 = 0.301 What is the value of log32?
   A. 0.1505
   B. 1. 055
   C. 1.550
   D. 1.505

7. If A = {Square numbers between 0 and 20 }. The value of n(A) is equal to
   A. 3
   B. 4
   C. 5
   D. 2

8. The maximum (upper bound) and minimum (lower bound of) x = 20 (when rounded to the nearest integer is)
   A. $19.5 \leq x \leq 20.5$
   B. $19.95 \leq x \leq 20.05$
   C. $19 \leq x \leq 21$
   D. $19.1 \leq x \leq 20.1$

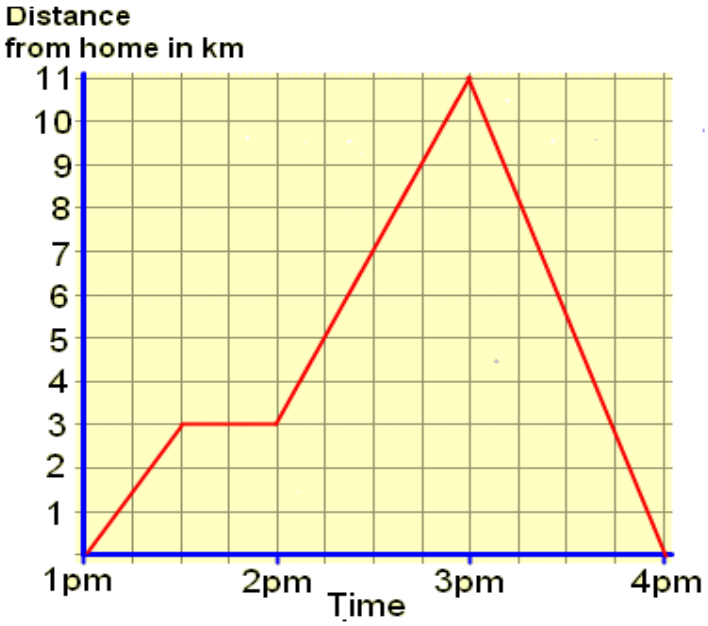
9. Cos2A is equal to
   A. SinA + SinB
   B. 2SinAcosA
   C. 2SinA
   D. $Cos^2A - sin^2A$

10. $\frac{d}{dx}(Cosx)$ *is equal to*
   A. – Cosx
   B. Sinx
   C. – Sinx
   D. tanx

PART TWO:- Structured questions. Answer ALL questions Total 80 Marks
You must show ALL your working in the space provided

Question 1

Warsame cycles from home to the town. He has stop for a tea . After tea, he cycles and back home again. The travel graph below shows his journey.



a) At what time did he begin to test? …….. (1mrks)

b) How many minutes did he rest? …… (1mrk)

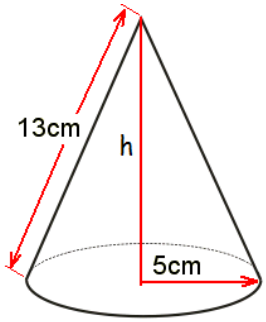
c) How far was he from home at 3 pm? …….. (1mrk)

d) How did it take him to back home? …….. (1mrk)

e) What speed did he travel to back home? (2mrks)

Question 2

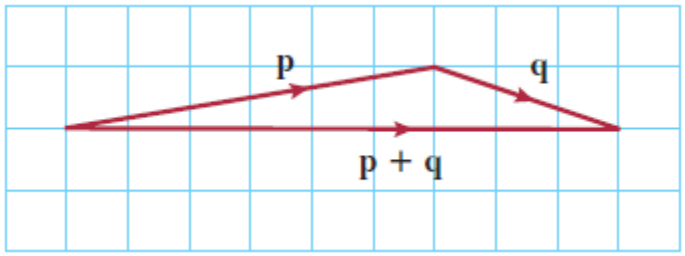
a) Find the height of this cone (2mrks)



b) Find the volume of the cone. Leave the answer in terms of π (3mrks)

Question 3

Diagram below shows three vectors **p, q** and **p + q**



Write down column vectors to describe each of the following

a) $\vec{p} = \begin{pmatrix} ..... \\ ..... \end{pmatrix}$ (2mrks)

b) $\vec{q} = \begin{pmatrix} ..... \\ ..... \end{pmatrix}$ (2mrks)

c) $\vec{p} + \vec{q} =$ (3mrks)

Question 4

If $A = \begin{pmatrix} 3 & -1 \\ 4 & 0 \end{pmatrix}$ and $B = \begin{pmatrix} 0 & 1 \\ -2 & 3 \end{pmatrix}$ Find:

a) A + B = (3mrks)

b) AxB = (4mrks)

c) Determinant of AB, |AB| = (2mrks)

Question 5

a) Solve this exponential equation
$3^{3+x} = 27^{x-1}$ (3mrks)

b) Solve by factorization ONLY
$2x^2 - 9x - 5 = 0$ (3mrks)

Question 6

a) Maryama paid $ 500 for a computer after getting a 15% discount.

i) What was the market price of the computer? (3mrks)

ii) Calculate the actual discount she got (2mrks)

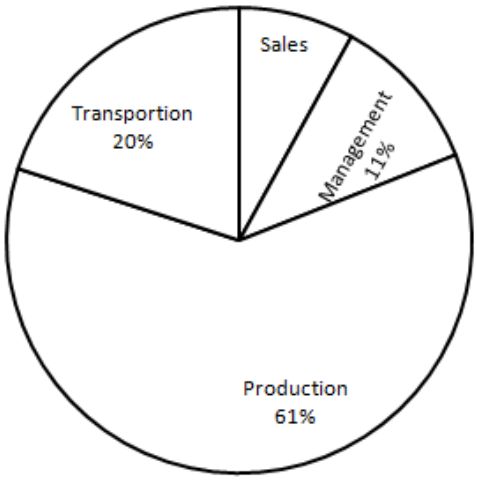
b) Given that an arithmetic series 2 + 4 + 6+ …….+ 50

i) Find the number of terms in the series (3mrks)

ii) Calculate the sum of the series (3mrks)

Question 7

This pie chart shows the different types of staff employed by a water company in Bosaso.



a) What percentage of the staff work in Sales (2mrks)

b) 200 people work for the company. How many of them work in transportation? (3mrks)

Question 8

a) Simplify (2mrks)

$$\frac{4^3 \times \left(4^{1/2}\right)^4}{4^4}$$

b) Find the value of $\int_1^3 (3x^2 - 2x + 2)dx$ (3mrks)

c) Multiply these complex numbers (2mrks)
$(5 - 3i)(5 + 2i) =$

d) Rationalize this irrational number using by conjugate (3mrks)
$\frac{2}{3-\sqrt{2}}$

Question 9

The line AB passes the points A(2, 3) and B(3, 5)

a) Find the length of line AB (2mrks)

b) Find the midpoint of line AB (2mrks)

c) Find the gradient of line AB (2mrks)

d) Find the equation of the line AB (3mrks)

Question 10

The marks for form two of mathematics test out of 50 are shown in the table.

a) Complete the table (4mrks)

Marks	Frequency f	Midpoint x	fx
0 – 4	3	2	2×3 = 6
5 – 9	2		
10 – 14	5		
15 – 19	7		
20 - 24	8		
25 – 29	9		
30 – 34	4		
35 – 39	2	37	37×2 = 74
	Σf =		Σfx =

b) Which is the modal class …….. (1mrk)

c) Calculate the marks (3mrks)

Question 11

The function h(x) = x^2 – 1 has domain {-2, -1, 0, 1}.

a) Find the range of h(x). (2mrks)

b) Map the function using arrow diagram (2mrks)

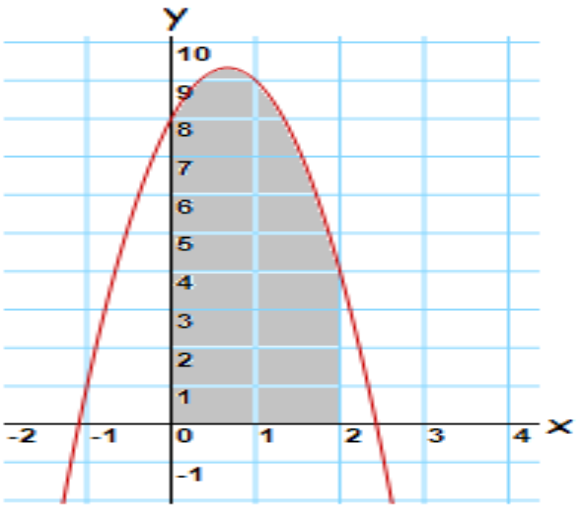
PART THEE:- Extended Questions (Total 10 Marks)

Answer **ONLY TWO** question. **Each question 5 marks**

Question 1

a) Find the gradient of $y = 3x^3 + 5x^2 - 7x + 1$ at x = -1 (2mrks)

b) Find the area in closed between the curve $y = -3x^2 + 4x + 8$, X-axis and lines x = 0 and x = 2 (3mrks)



Question 2

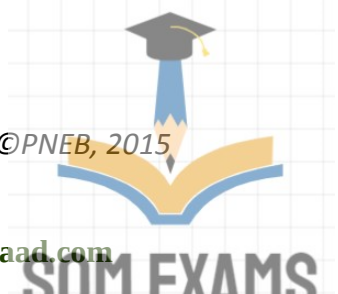
a) In how many ways you can arrange 5 different book on a shelf taken at a time 3 books

b) Use binomial theorem to expand $(x+3)^5$
(3mrks)

Question 3

a) If $(y+2)^2 = 8(x-3)$ is an equation of a parabola.
Determine the focus of the parabola (2mrks)

b) The center of a circle is C(- 1, 3) and radius 4. Calculate and write down the full equation of this circle. (3mrks)



Question 4

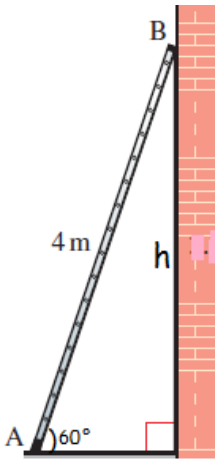
a) Find the irrational value of Sin75° (3mrks)

(Hint: use $\text{Sin}(A + B) = \text{SinACosB} + \text{SinBCosA}$)

(Given: $\text{Sin}45° = \text{Cos}45° = \frac{1}{\sqrt{2}}$, $\text{Cos}30° = \frac{\sqrt{3}}{2}$, $\text{Sin}30° = \frac{1}{2}$)

b) A ladder is 4 metres long. It leans against a vertical wall, and the angle that the ladder makes with the horizontal ground is 60°. Find the height of the wall? (2mrks)

(Given:- Sin60° = $\frac{\sqrt{3}}{2} = 0.86$, Cos60° = ½ = 0.5)



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