MINISTRY OF EDUCATION AND HIGHER EDUCATION

FORM FOUR EXAMS, 2019

MATHEMATICS

2019

P/LAND NATIONAL EXAMINATION BOARD

MINISTRY OF EDUCATION AND HIGHER EDUCATION
PUNTLAND NATIONAL EXAMINATIONS BOARD

Code Number

FORM FOUR EXAMINATION 2019
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 1, 13, 14 and 15. Those will not be marked.
- If you make a mistake, **cross out the incorrect** answer and **write your correct answer.**

This exam paper consists of following parts

Parts	Marks
Section A	
Part one: Multiple choice	**10** marks
Part two: Structured Questions	**30** marks
Section B: Structured Questions	60 marks
	Total: 100 Marks

For the markers only

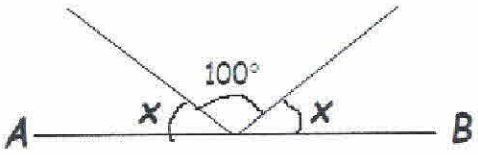
PARTS	MARKS
Section A	
Part one: Multiple choice	
Part two: Structured Questions	
Section B: Structured Questions	
TOTAL	%

Use this page for through work, it will not be marked.

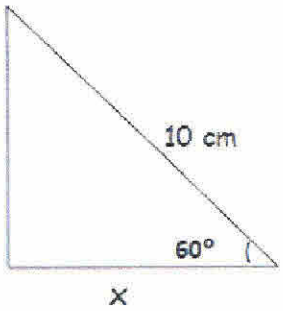
Section A: - Basic mathematics **40 marks**
Part one: Circle the letter of the correct answer **(10 marks)**

1) How many prime numbers are there between 20 and 30
   A) 1
   B) 3
   C) 2
   D) 5

2) AB is a straight line, the value of angle x is
   A) 50°
   B) 80°
   C) 20°
   D) 40°



3) The value of x in the right triangle is
   A) 5cm
   B) 8cm
   C) 20cm
   D) 10cm



4) A coin is tossed two times, the probability of getting three heads (HHH) is

   A) $^1/_2$
   B) $^1/_4$
   C) $^1/_6$
   D) $^1/_8$

5) Which inequality represent the diagram below

A) $-2 \leq x < 3$

B) $-2 \leq x \leq 3$

C) $-2 \geq x < 3$

D) $-2 < x < 3$

6) $\int Cosx\, dx$ is equal to

A) $-Cosx$

B) $-Sinx$

C) $-tanx$

D) $Sinx$

7) The median and mean for the following set of data are
6, 8, 5, 7, 9, 15, 13

A) Mean = 7 and median = 8

B) Mean = 9 and median = 7

C) Mean = 9 and median = 8

D) Mean = 8 and median = 9

8) The value of **x** in this equation $\frac{18}{x} = 6$ is:

A) 2

B) 3

C) 12

D) 6

9) $\frac{d}{dx}(tanx)$ is equal to

A) Sec^2x

B) $Secx$

C) $Cosx$

D) $Sinx$

10) $\log_2 3 = x$ in exponential form is equal to

A) $x^2 = 3$

B) $3^x = 2$

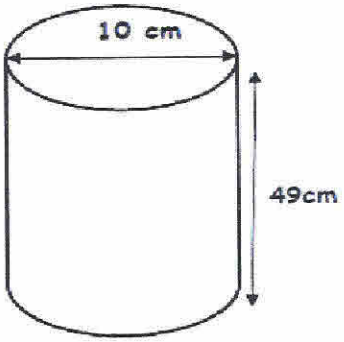
C) $2^x = 3$

D) $3^x = 2$

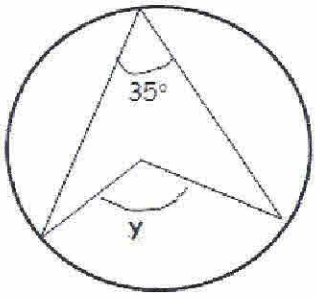
Part two:- basic mathematics (30 marks)

(Answer all questions)

1) Calculate The volume of this cylinder (3 marks)



2) Find the size of angle y (2 marks)



3) Simplify (2 marks)

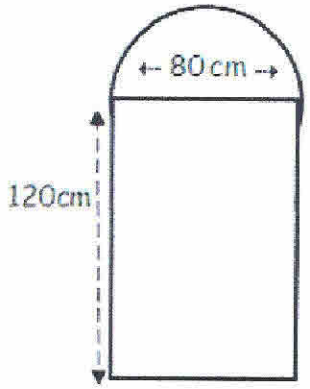
$a)\ \dfrac{\sqrt{50}}{\sqrt{8}} =$

b) Expand and simplify (2 marks)

$$4x - 5(2x - 3y) =$$

4) The number of employees in a company is 1,800 , if 360 of them are female. Find the percentage of the female (3 marks)

5) The figure right is a window in the shape of a rectangle with a semicircle top, the dimensions are shown on the diagram. Calculate the area of the window (4 marks)



6) Simplify (2 marks)

a) $\frac{2x-1}{3} + \frac{3x}{2} =$

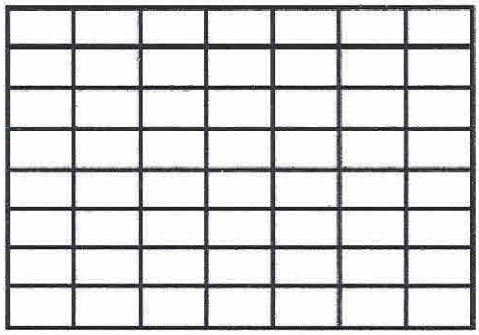
b) Convert 0.05km to meters (1 mark)

7) Solve by factorization ONLY $3x^2 - 11x + 6 = 0$ (3 marks)

8) Mark L the subject of this formula (3 marks)

$$\frac{R}{QN} = \sqrt{\frac{F+L}{L}}$$

9) Given this vector $\vec{a} = \begin{pmatrix} -4 \\ -2 \end{pmatrix}$. Draw $-\vec{a}$ in the gird below (2 marks)



10) Evaluate (2 marks)

$$\lim_{x \to 5} \frac{x^2 - 25}{x - 5} =$$

Section B: - structured questions

Answer ALL questions **(60 marks)**

Question 1

Given these complex number $3-4i$ *and* $3+4i$

a) Find $(3-4i)(3+4i)$ (2 marks)

b) Find $\frac{3-4i}{3+4i}$ (3 marks)

Question 2

a) Find the 20th term of the arithmetic series 3 + 7+ 11 …… (2 marks)

b) Find the sum of the first 20 terms of the above series. (2 marks)

Question 3

A. Given that $M = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$, $N = \begin{pmatrix} 3 & 2 \\ 0 & 1 \end{pmatrix}$ *and* $P = \begin{pmatrix} 2 \\ 0 \end{pmatrix}$

i. Find MP (2 marks)

ii. M + N (2 marks)

iii. N^{-1} *inverse of matrix* N (3 marks)

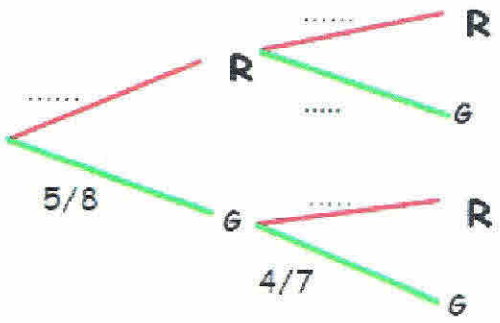
B. Evaluate

$$\int_1^2 (3x^2 - 4)dx$$ (2 marks)

Question 4

A bag contains 3 red balls and 5 green balls, two balls are picked from the bag without replacement.

a) Complete the tree diagram (2 marks)



b) Find the probability that the two balls are

i) Different colors (2 marks)

ii) Same color (2 marks)

Question 5

a) Find the gradient of the curve $y = x^2 - 2x - 3$ when x = 2 (2 marks)

b) Find the stationary point of $y = x^2 - 2x - 3$
and determine whether it is minimum or maximum (3 marks)

Question 6

a) If $\boldsymbol{Cosx} = \frac{4}{5}$

i) Find Sinx (2 marks)

ii) Find Sin2x (3 marks)

b) Prove this identity (3 marks)

$tanxCosxSinx = 1 - Cosx^2$

c) Solve $5\boldsymbol{Sinx} - 2 = \boldsymbol{Sinx}$ for $0° \leq x \leq 180°$ (3marks)

d) Evaluate (2 marks)

$^9C_2 =$

Question 7

if $f(x) = 3x - 4$, $g(x) = 3x - 1$

a) Find fg(1) (3 marks)

b) Find $f^{-1}(x)$ (3 marks)

Question 8

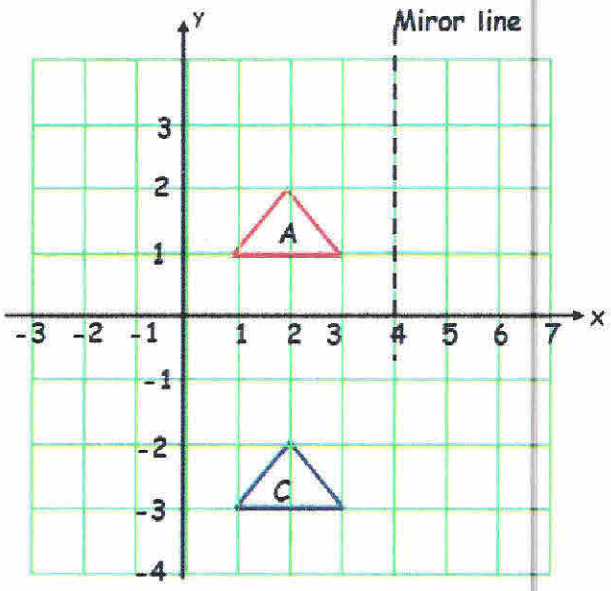
Using the right diagram

a) Draw the image of the triangle A after reflecting the mirror line shown and Label B on the new triangle (1 mark)

b) Write the equation of the mirror line .....(1 mark)

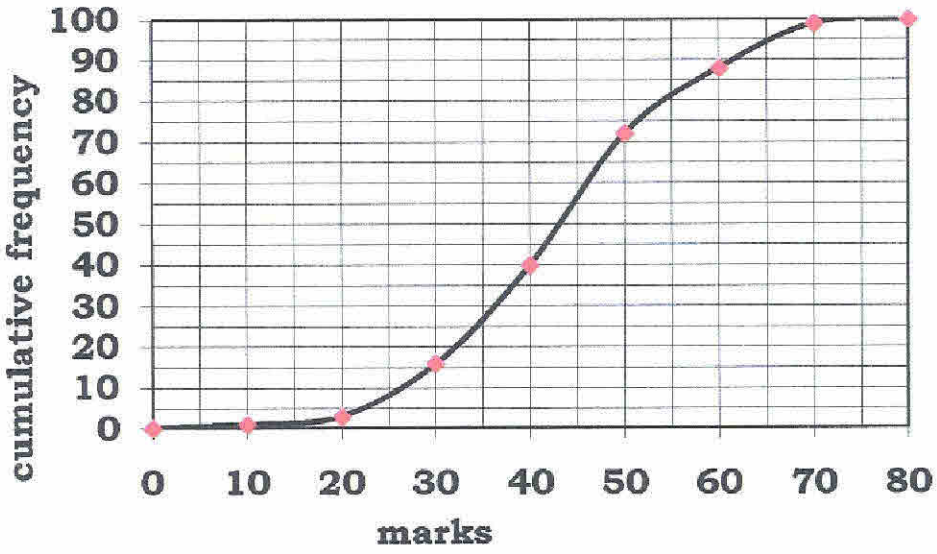
c) The single transformation which formed triangle C from triangle A

is ..... by a column vector of $\begin{pmatrix} & \\ & \end{pmatrix}$ (2 marks)



Question 9

The cumulative frequency curve shows the marks obtained by 100 students in an exam



Estimate from the graph

a) Lower quartile (2 marks)

b) Median (2 marks)

c) Upper quartile (2 marks)

d) Calculate

i) Inter quartile range (1 mark)

ii) Quartile deviation (1 mark)

END.

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