

MINISTRY OF EDUCATION AND HIGHER EDUCATION

FORM FOUR EXAMS, 2013

MATHEMATICS



P/LAND NATIONAL EXAMINATION BOARD

PART ONE: MULTIPLE CHOICE (10 MARKS)

Circle the correct answer. If you change your mind please cross out the wrong answer and circle the correct answer clearly (each question 1 mark)

1. The logarithmic form of $7^2 = 49$ is

a) $\text{Log}_2 49 = 7$

b) $\text{Log}_7 49 = 2$

c) $\text{Log}_{49} 2 = 7$

d) $\text{Log}_7 2 = 49$

2. The distance between the points A(2, -2) and B(-4, -5) is

a) $\sqrt{13}$

b) $\sqrt{85}$

c) $3\sqrt{5}$

d) $5\sqrt{3}$

3. The gradient of $2y + 4x - 8 = 0$ is

a) 2

b) -2

c) -4

d) 4

4. $3(3x - 1) = 4(x + 3)$ the value of **x** is

a) 1

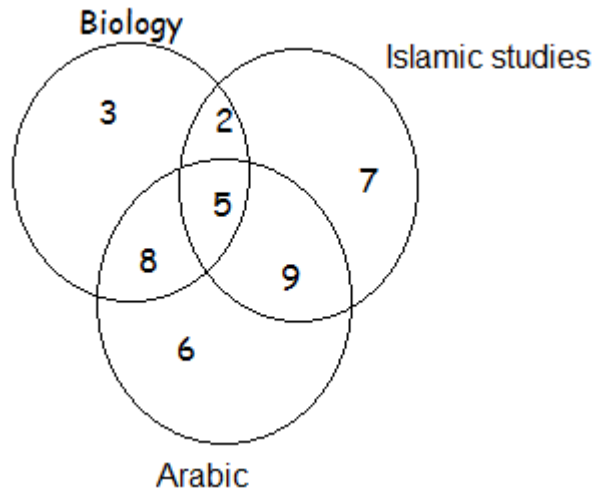
b) 0

c) 4

d) 3



5. The Venn diagram below represents the number of student who study the following subjects Biology, Islamic studies and Arabic language



The number of students that study both Arabic and Islamic studies is

- a) 5
 - b) 8
 - c) 9
 - d) 14
6. 7C_2 is equal to
- a) 20
 - b) 21
 - c) 22
 - d) 24

7. The magnitude of vector $a = \begin{pmatrix} -3 \\ 6 \end{pmatrix}$ is

a) $3\sqrt{5}$

b) $5\sqrt{3}$

c) $\sqrt{35}$

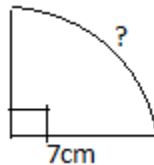
d) $3\sqrt{2}$

8. In the diagram below, the length of the arc is

a) 11cm

b) 8 cm 25cm

c) 15 cm



9. $\int \frac{3}{x^2} dx$ is equal to

a) $-3x^{-1}$

b) $-3x^{-4}$

c) $3x^{-3}$

d) $3x^4$

10. Which of the following can occur more than one time in a set of data

a) Mode

b) Median

c) Mean

d) Range

PART TWO: STRUCTURED QUESTION. ANSWER ALL QUESTIONS (90 MARKS)
You must show ALL your working in the space provided.

Question 1

Given the matrices $A = \begin{pmatrix} 3 & 2 \\ 4 & 1 \end{pmatrix}$ and $B = \begin{pmatrix} -1 & 1 \\ 2 & 3 \end{pmatrix}$ and that $C = A \times B$

a) Find the matrix C (4 marks)

b) Find the determinant of C (2marks)

Question 2

a) Solve the equation

$$\frac{2}{x+1} = \frac{x+2}{3} \quad (3 \text{ marks})$$

b) Evaluate $4^{3/2} \times 8^{2/3} \div (16)^{1/2}$ (3marks)

c) Rearrange this formula to be **I** the subject of the formula $Q = I^2 Rt$. (3marks)

d) If $Q = 1000$, $t = 20$ and $R = 2$. Find the value of **I** (2marks)

e) Simplify $\frac{\text{Log } 25 + \text{Log } 625}{\text{Log } 5}$ (3marks)

Question 3

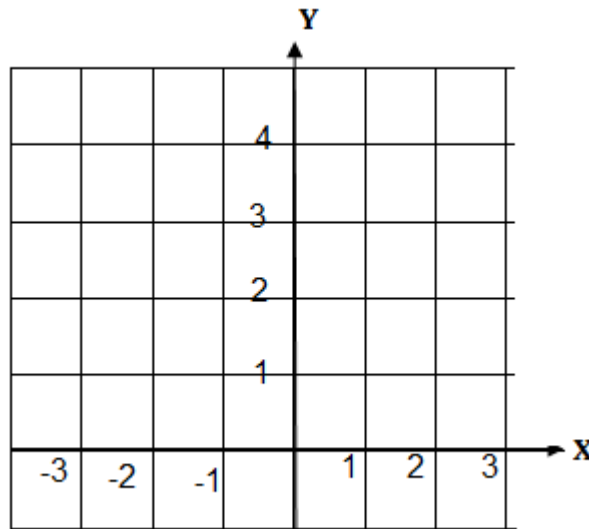
a) If $y = -x^2 + 4$ complete the table below

X	-2	-1	0	1	2
Y			4		

(2marks)

b) Draw the graph of $y = -x^2 + 4$ in plane below

(2marks)



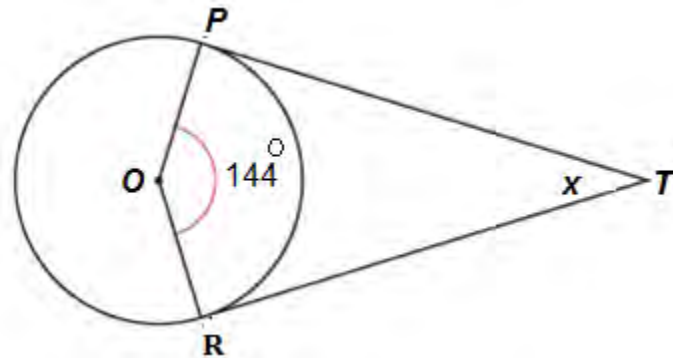
c) Shade the region of $y \leq -x^2 + 4$, $x \geq 0$ and $y \geq 0$

(2marks)

Question 4

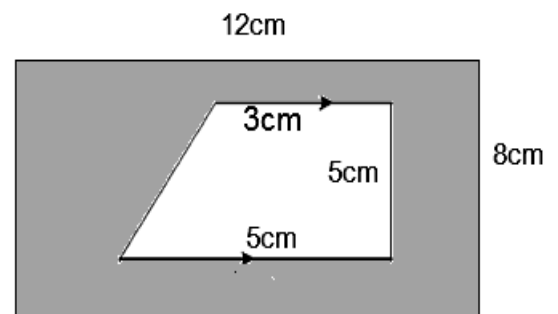
- a) The diagram shows a circle, centre O. PT and RT are tangents to the circle. Angle POR = 144° . Work out the size of angle PTR, marked x.

(2marks)



- b) Calculate the shaded area in the shape below.

(3marks)



Question 5

a) For the set of data 3, 4, 5, 6, 7, 9, 10, 12 Calculate

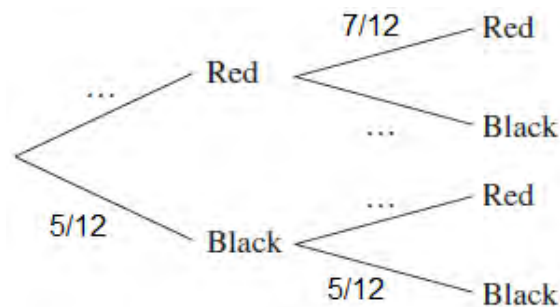
i) Arithmetic mean (2marks)

ii) Standard deviation (3marks)

Question 6

A bag contains 7 Red and 5 black discs. Two discs are drawn from the bag at random, **with** replacement

a) Complete the tree diagram below (3marks)



b) What is the probability that the two discs will be

i) Red (2marks)

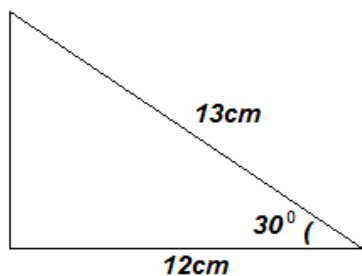
ii) Same colour. (3marks)

Question 7

a) Prove the identity

$$\cot^2 x - \cos^2 x \equiv \cot^2 x \cos^2 x \quad (3\text{marks})$$

b) Find the area of the triangle ABC. ($\text{Sine } 30^\circ = \frac{1}{2}$) (3marks)



Question 8

a) A curve passes through the point (3, -2) and its gradient function is $2x - 5$.
Find its equation (3marks)

b) Calculate the area enclosed the curve $y = 3x^2 + 2x$, line $x = 1$, $x = 3$ and
X-axis. (3marks)

Question 9

a) Find coordinates of the points where the line $y = x$ meets the parabola
 $y = 3x^2 - 2x$ (4marks)

b) The arrow diagram below shows two relations



i) State the type of each relation

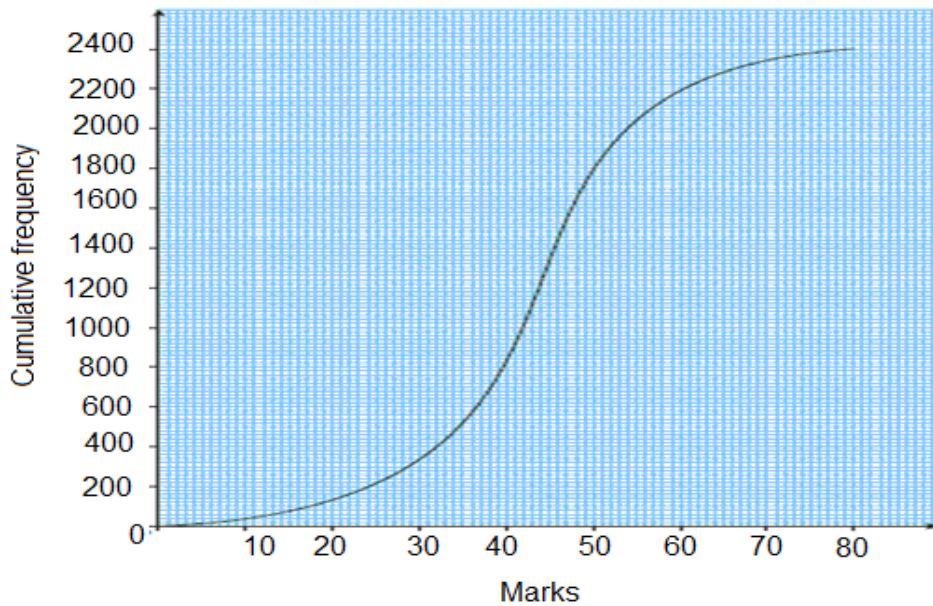
R1:- (1mark)

R2 (1mark)

ii) Which is a function R1 or R2..... (1mark)

Question 10

2400 people took an examination paper. The maximum mark for this paper was 80. The cumulative Frequency graph below gives information about the marks. The pass mark was 40 marks.

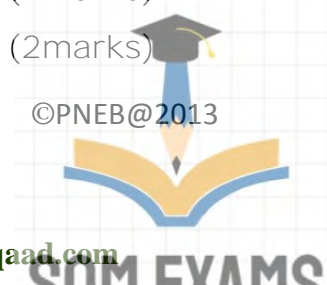


a) Use the graph to estimate

i) Lower quartile (2marks)

ii) Median (2marks)

iii) Upper quartile (2marks)

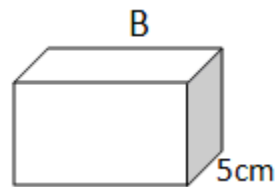
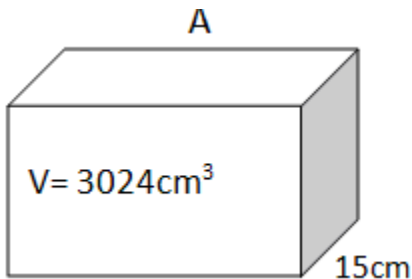


Question 11

a) Calculate the size of an interior angle of a regular Hexagon. (2marks)

b) Convert 240° to radian (2marks)

c) The two cuboids **A** and **B** shown below are similar. Calculate the volume of cube B. (3marks)



- d) The parallel sides of a trapezium are 13cm and 11 cm. If the area of the trapezium is 84cm^2 . Calculate the height of the trapezium. (2marks)

Question 12

a) Evaluate $\int_{-1}^2 (4x^3 - 3x^2 - 2)dx =$ (3marks)



b) If $f(x) = \frac{x-2}{2}$. Find $f^{-1}(3)$ (3marks)

c) Multiply the following complex numbers (3marks)

$$(12 - 4i)(3 + 5i) =$$

d) How many ways can 4 people sit in 10 seats, on a straight line? (3 marks)

END

