NAME……..INDEX NO…….

SCHOOL……CLASS……SIGNATURE……..

121/1 MATHEMATICS
PAPER 1
JULY/AUGUST 2013
TIME: 2 HOURS 30 MINUTES

LARI DISTRICT MOCK EXAMINATIONS
KENYA CERTIFICATE OF SECONDARY EXAMINATION
MATHEMATICS
PAPER 1

INSTRUCTIONS TO CANDIDATES.

(i) Write your name and index number in the spaces provided.
(ii) This paper contains TWO sections. Section I and Section II.
(iii) Answer ALL the questions in SECTION I and any FIVE questions from SECTION II.
(iv) All answers and working must be written on the question paper in the spaces provided below each question.
(v) Non-programmable silent electronic calculators and KNEC mathematical tables may be use except where stated otherwise.

FOR EXAMINERS USE ONLY.

SECTION I

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	TOTAL

SECTION II

17	18	19	20	21	22	23	24	TOTAL

GRAND TOTAL.

SECTION I (50 MARKS)

1. Given $\dfrac{\frac{3}{5}\,of\,60-2\frac{2}{3}\times1\frac{1}{2}}{5\frac{5}{8}\times1\frac{7}{9}-\frac{5}{2}\,of\,\frac{12}{5}+2\frac{4}{5}\div\frac{7}{10}}=m^m$ find the value of m. (3mks)

2. Find the value of x which satisfy the following equation. $5^{2x}-6(5x)+5=0$ (3MKS)

3. Given that, $\underline{a}=\begin{pmatrix}-2\\8\end{pmatrix}$, $\underline{b}=\begin{pmatrix}-6\\4\end{pmatrix}$ and $\underline{c}=\begin{pmatrix}-4\\2\end{pmatrix}$ and that $\underline{p}=4\underline{a}-8\underline{b}+6\underline{c}$.

Find $|\underline{p}|$ (3MKS)

4. Using logarithm tables, to evaluate (4MKS)

$$\left[\frac{0.9642\times(0.02963)^2}{0.009238}\right]^{0.25}$$

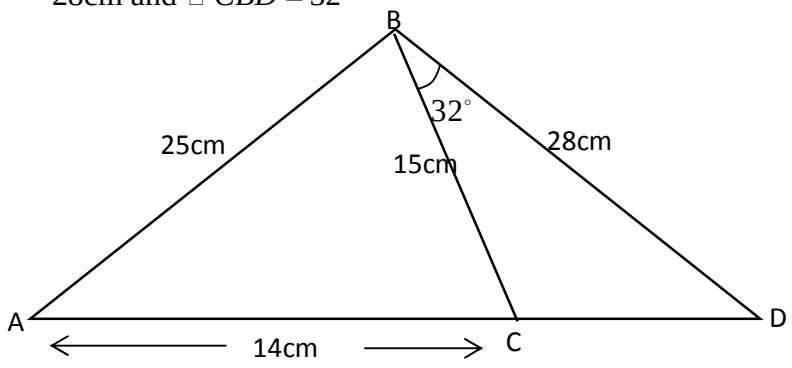
5. Simplify completely $\dfrac{9a^2y - 16b^2y^3}{4by^2 - 3ay}$ (3mks)

6. Find the integral values that satisfy the simultaneous inequalities below. (3mks)

$4x - 6 \geq x - 12$

$8 - 3x > 2x - 7$

7. Find the area of the triangle below given that lines AB=25cm, BC = 15cm, AC = 14cm, BD = 28cm and $\angle CBD = 32^\circ$ (4MKS)



8. A straight line has the equation $3y - 5x = 4$. Determine the acute angle which the line makes with the X-axis. (3mks)

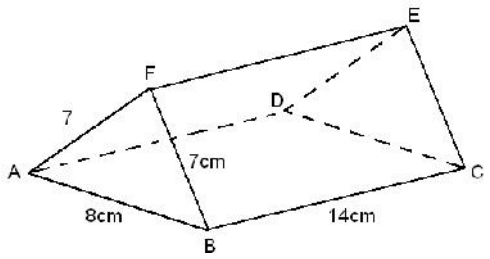
9. Find the Centre and the radius of a circle whose equation is $\frac{5}{3}x^2 + \frac{5}{3}y^2 = 10x - \frac{20}{3}y + 5$ (3mks)

10. Without using a calculator or mathematical tables, simplify $\frac{\sqrt{5}}{3 - \sin 60^\circ}$ (4MKS)

11. The data below shows masses in grams of pieces of metal in a factory. If the mean mass is 3.3g, find the value of m. (3mks)

Mass (x) g	1	2	3	4	5	6
Frequency (f)	4	7	2m	2	5	m

12. Draw using the scale of 1:2 the net of the figure below. (2 MKS)



13. A pendulum with a string of length r cm is hanged on a nail and when swung at an angle of 74° it traces an arc of length 46.8cm. Find the area of the sector traced by the pendulum.

(3MKS)

14.Atieno is now four times as old as her daughter and six times as old as her son. Twelve years from now, the sum of the ages of her daughter and son will differ from her age by 9 years. What is Atieno's present age? (3 MKS)

15. Atieno and Kamau started a business and they realized a profit of Kshs. 81,000. The profit was to be allocated to development, dividends and reserves in the ratio **4:5:6** respectively. The dividends were shared in the ratio of their ages. If their ages were 25years and 20 years respectively, find how much each of the got. (4mks)

16. A Kenyan tourist left Germany for Kenya through Switzerland. While in Switzerland he bought a watch worth 52 Deutsche marks. Find the value of the watch in:- (2 marks)

(a) Swiss Francs

(b) Kenya shillings

Use the exchange rates below

1 Swiss Franc = 1.28 Deutsche marks
Swiss Franc = 45.21 Kenya shillings

SECTION II (50 MARKS)

17. At 2.00 pm, a ship is at a position P from where a light house L is 12km away on a bearing of 320^{o}. At 4.00pm, the ship is at a position Q from where the lighthouse is now on a bearing of 035°. Given that the ship is traveling due West, find by calculation;

a) How far the lighthouse is from Q. (3mks)

b) The speed of the ship. (2mks)

c) The closest distance of the ship from the light house. (2mks)

d) The lighthouse, point Q and point P were noted to be along the circumference of a circular field. Find the distance of P from the Centre of the field. (3mks)

18. In chemistry form 4 classes, $\frac{1}{3}$ of the class are girls and the rest boys. $\frac{4}{5}$ of the boys and $\frac{9}{10}$ of the girls are right handed while the rest are left handed. The probability that a right – handed student breaks a conical flask in any practical session is $\frac{3}{10}$ and the corresponding probability for a left – handed student $\frac{4}{10}$. The probabilities are independent of the student's gender.

(a) Represent the above information on a tree diagram with independent probabilities. (2mks)

(b) Determine the probability that student chosen at random from the class is left handed and does not break a conical flask in simplest form. (3mks)

(c) Determine the probability that a conical flask is broken in any chemistry practical session in simplest form. (3mks)

(d) Determine the probability that a conical flask is not broken by a right handed student in the simplest form. (2mks)

19.a) A car dealer buys a car for Kshs.1,250,000 and hire it for 25 weeks at a charge of Kshs. 3,500 per day. Insurance costs Kshs. 33,700 during the entire period, at the end of which he sells it at Kshs. 750,000. Calculate the profit that he makes on the transaction. (4mks)

b) If instead of the dealer hiring the car, he sells it to a customer who pays a deposit of Kshs. 450,000 and the balance to be paid in six months at a compound interest of 10% per annum compounded quarterly, find the profit he makes for this deal. (4mks)

c) Which deal makes more profit and by how much? (2mks)

20. Complete the table below for the function $y = 2x^3 + 5x^2 - x - 6$ (2 mks)

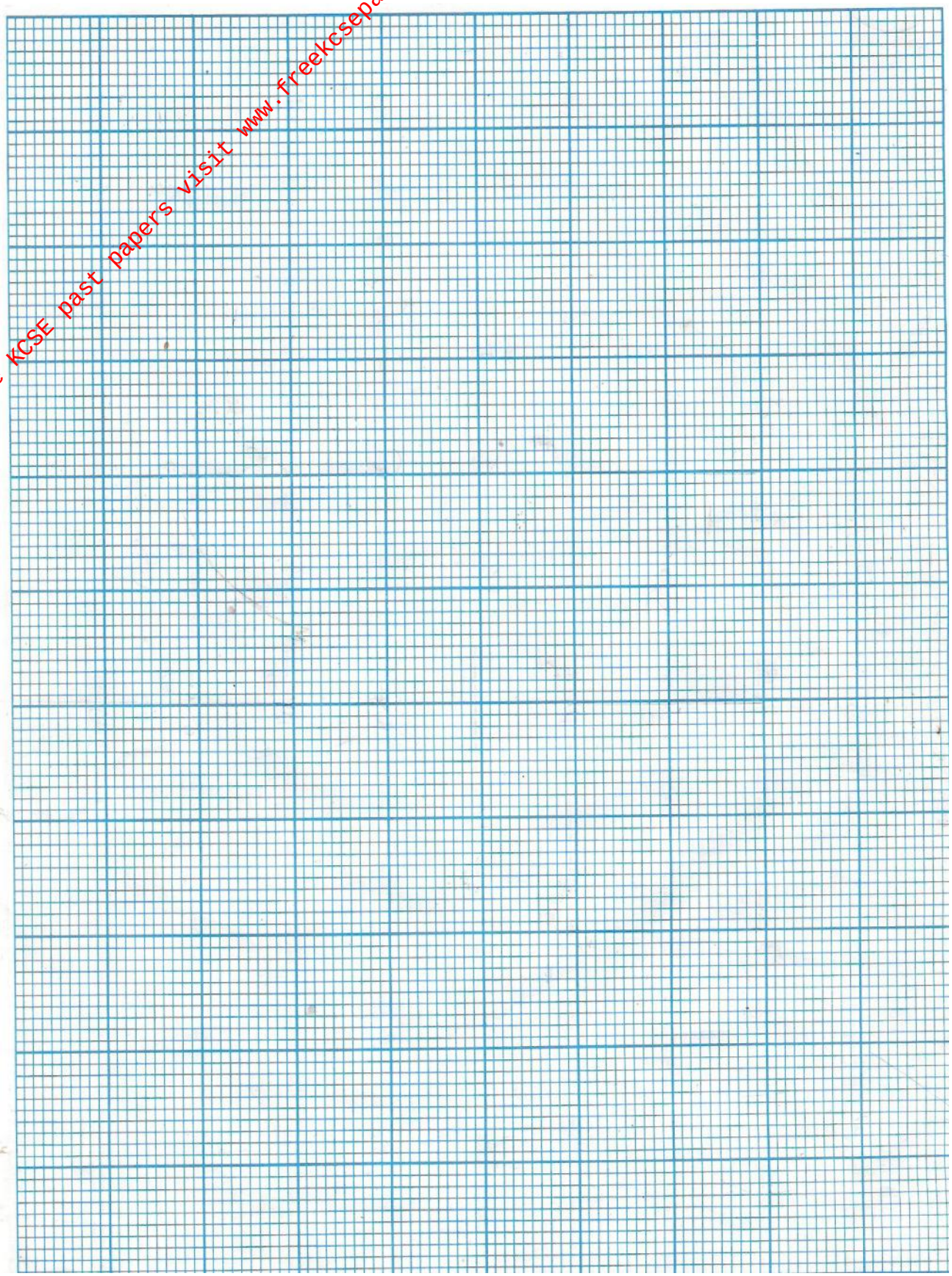
x	-4	-3	-2	-1	0	1	2
$2x^3$	-128	-54			0	2	16
$5x^2$	80	45	20	5	0	5	20
-x	4	3			0	-1	
-6	-6	-6	-6	-6	-6	-6	-6
y	-50				-6	0	

(b) On the grid provided draw the graph $y = 2x^3 + 5x^2 - x - 6$ for $-4 \le x \le 2$. Use 2cm to represent 1 unit on the x-axis and 1 cm to represent 5 units on the y – axis (4 mks)

(c) By drawing a suitable line, use the graph in (b) to solve the

i. equation $2x^3 + 5x^2 + x - 4 = 0$ (2 MKS)

ii. equation $2x^3 + 5x^2 - x + 2 = 0$ (2 MKS)



21. Use ruler and compass only for all constructions in this question.

(a) Construct triangle ACX such that AC = 6.7cm, AX = 8.4cm and $\angle CAX = 45^0$. (3MKS)

(b) (i) On the same diagram, construct a triangle ABC such that B lies on AX and angle AXC = angle XCB. (2mks)

(ii) Measure AB: (1mk)

(c) On the same side of CX as B, construct the locus of a point P such that angle CPX = 45^0. (2mks)

(d) Calculate the area of triangle ABC (2mks)

22. A glass of radius 3 cm in the form of a cylinder contains water to a height of 9cm.

a) Find the volume of the water in the glass correct to 2 decimal places. (2mks)

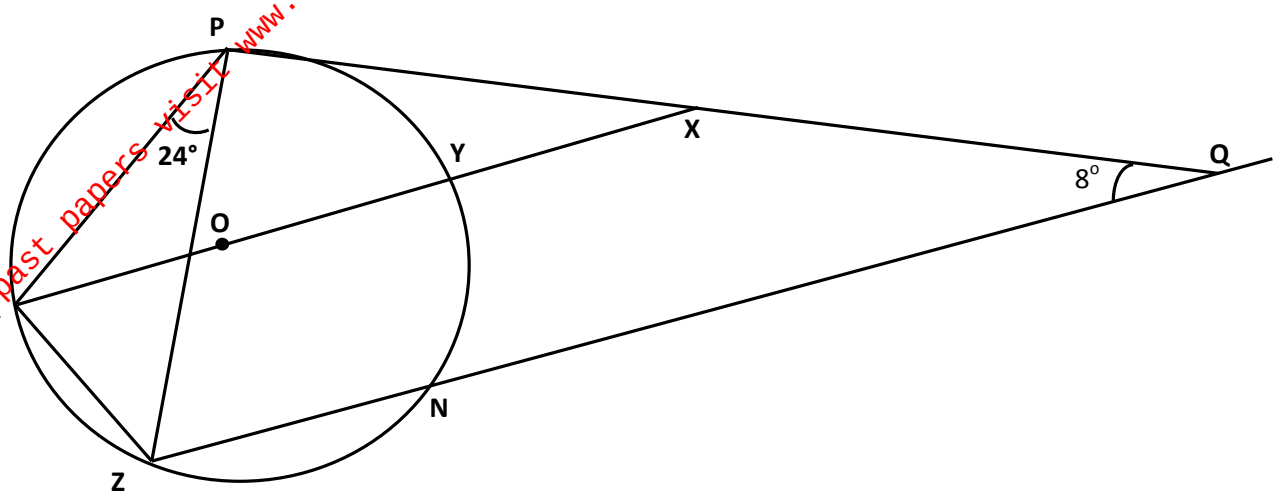
b) When a spherical marble is submerged into the water in the glass, the water level rises by 1cm.
Calculate:

i. The volume of the marble correct to 2 decimal places. (2mks)

ii. Radius of the marble correct to 2 decimal places. (3mks)

iii. If the height of the glass is 13cm, calculate the surface area of the glass not in contact with water after the above process. (3mks)

23. In the figure below RY is the diameter with O as the center. If <PRZ = 108^o, <RPZ = 24^o, <PQZ = 8^o and PQ is a tangent to the circle. ZNQ is a straight line.



Calculate the following angles;

a) <XRP (2 Marks)

b) <RPX (2 Marks)

c) <PXY (2 Marks)

d) <YZN (2 Marks)

e) <ZYN (2 Marks)

24. The distance between two towns M and N is 280 km. A car and a lorry travelled from M to N. The average speed of the lorry is 20 km less than that of the car. The lorry takes one hour twenty minutes more than the car, to travel the distance.

a) Find the speed of the car correct to 2 d.p (4mks)

b) If the lorry started its journey from M to N at 8:15 am and the car started 4 hours 20minutes later, in the same direction, at what time did the car overtake the lorry? (3mks)

c) How far from town N will the lorry be when the car reaches town N correct to 2 d.p? (3mks)