Name……. **Index No**……/…….

School…… **Date** …….

Candidate's Signature……

121 /2
MATHEMATICS
PAPER 2
JULY/AUGUST 2012
2 ½ HRS

BURETI DISTRICT JOINT EVALUATION – 2012

Kenya Certificate of Secondary Education (K.C.S.E)

INSTRUCTIONS TO CANDIDATES

(a) Write your name and index number in the spaces provided above.
(b) This paper consists of **TWO** sections. Section I and Section **II**.
(c) Answer **ALL** the questions in section 1 and only **FIVE** questions from Section **II**
(d) All answers and working must be written on the question paper in the spaces provided below each question.
(e) Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
(f) Marks may be given for correct working even if the answer is wrong.
(g) Non- programmable silent calculators and **KNEC** mathematical tables may be used except where stated otherwise.
(h) This paper consists 16 printed papers
(i) Candidates should check the question paper to ascertain that all the papers are printed as indicated and that no questions are missing.

FOR EXAMINERS USE ONLY

Section I

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

Section II

17	18	19	20	21	22	23	24	TOTAL

GRAND TOTAL

This paper consists of 16 printed pages.
Candidates should check the question paper to ensure that all pages are printed as indicated and no questions are missing

1. By use of logarithms evaluate; (4mks)

$$\sqrt[3]{\frac{0.01369396.5}{64.11-0.001912}}$$

2. a) Write down the first five terms of the expansion of $(1-\frac{x}{3})^5$ (2 mks)

b) Using the first three terms of the expansion. Find the values of $(1.01)^5$ to 4dp. (2mks)

3. Write in the simplest form using a rational denominator. (2 Marks)

$$\frac{2\sqrt{3}}{\sqrt{3}+\sqrt{2}}$$

4. The data below shows marks scored by 8 form four students in Ikutha district mathematics content

44. 32. 67. 52, 28, 39, 46, 64.Calculate the mean absolute deviation. (4 Marks)

5. Make P the subject of the formula given. (3 Marks)

$$d = \sqrt[3]{\frac{p}{q-p}}$$

6. The equation of a circle is $x^2 + y^2 + 6x - 10y - 2 = 0$. Determine the co-ordinates of the centre of the circle and its radius. (3 Marks)

7. Find the equation of the tangent at point (3,1) to the curve $y = x^2 - 4x + 4$. (3 Marks)

8. Kitheka deposited ksh.50,000 in a financial institution in which interest is compounded quarterly. If at the end of second year he received a total amount of ksh79,692.40. Calculate the rate of interest p.a (3 Marks)

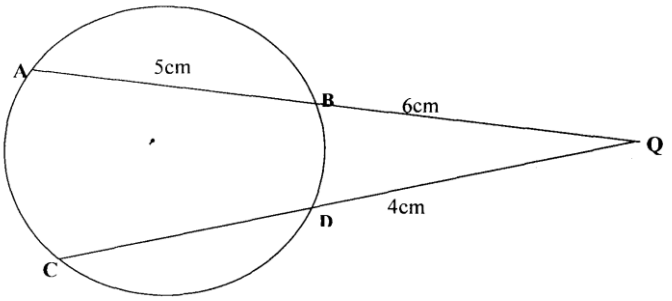
9. A contractor employs 40 men to do a piece of work in 60 days each man working 9 hours a day. He is then requested to do the job in 48days. How many more men working l0 hours a day does he need to employ. (3 Marks)

10. 3cm3 of water is added to $2cm^3$ of a certain medicine which cost sh.12 per cm^3. The chemist sells the diluted medicine at sh.4.50 per cm3. Calculate the percentage profit. (3 Marks)

11. A (50°S 20°E) and B(50°S I 60°W) are two points on the earth's surface. Calculate the distance between A and B in kilometer along the great circle. (take radius of the earth to be 6370km). (4 Marks)

12. Evaluate $\int_{-1}^{2} \frac{(1-x^2)}{X+1} dx$ (3mks)

13. Chords AB and CD in the figure below intersect externally at Q. if AB 5cm BQ = 6cm and DQ = 4cm, calculate the length of chord CD. (3 Marks)



14. Find the sum of the following GP. (3 mks)
2 + 10 + 50 ……1250

15. Given that a - 7.6cm, b=2.4cm and c = 4.0cm find the maximum value of;
Find the value of x leaving your. (3mks)
Answer as a mixed fraction.
Log $\frac{3}{4}$ - $\frac{1}{2}\log_4(2x-5) = \frac{3}{2}$

16. Two bags A and B each contain a mixture of red and blue balls. Bag A contains 9 red balls and 11 blue balls while bag B contains 15 red balls while and 10 blue balls.
A bag is selected at random and a ball is picked at random from it

a) Draw a probability tree diagram to illustrate this information. (1 Mark)

b) Find the probability that the ball picked is blue. (2 Marks)

SECTION 11(50 MARKS)
Answer only five questions from this section

17. a) income tax is charged on an annual income at the following rate (2mks)

Taxable income k£ pa	Rates Ksh per pound
1 – 2100	2
2101-4200	3
4201 – 6300	5
6301 – 8400	7
8401 and above	9

Mrs Mwangi earns a basic salary of ksh.24000 per month. She is housed and pays a nominal rent of Ksh 800 per month insurance premium of ksh.800 per month for

which she gets a tax relief of 10% on the total premium paid family relief is k 320 per year.

Calculate her;

a) Total taxable pay per year (ksh). (2 Marks)

b) Total relief per year (ksh). (2 Marks)

c) Tax deduction per month (ksh). (4 Marks)

d) Net salary per month. (2 marks)

18. The table below shows some values of the function

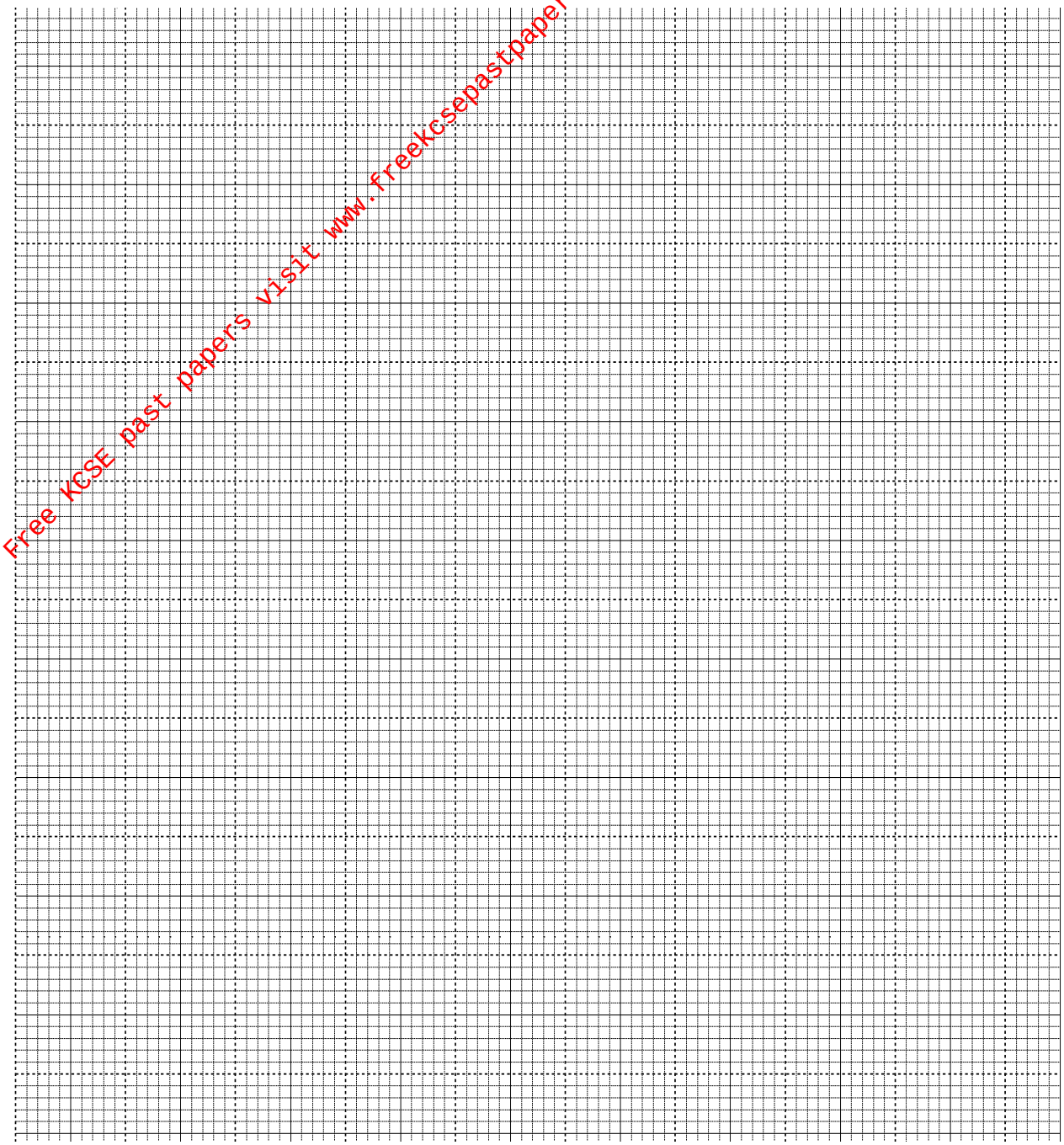
$y = x^3 2x^2 - 2x + 2$ for $-2 \leq x \leq 3$

X	-2	-1	0	1	2	3
X^3	-8		0			
$-2x^2$	-8		0			
-2x	4		0			
2	2		2			
Y	-10		2			

a) Complete the table. (2mks)

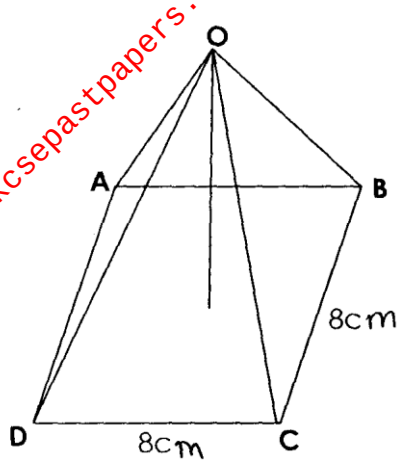
b) Use the completed table to draw the graph of the function.

$Y = x^3 - 2x + 2$ (3mks)



c) Use integration method to find the area bounded by the curve. (5mks)
Using the graph solve the cubic equation.
$X^3 - 2x^2 = 2x - 2$

19. A pyramid with a vertex 0 and edge OA, OB, OC and OD each of 17cm long stands on a square base ABCD of side 8cm as shown below.



Calculate

a) The height OP of the pyramid. (3 Marks)

b) The angle between an edge and the base. (3 Marks)

c) The angle between a sloping face and the base. (4mks)

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20. A particle moves along a straight line such that its displacement S metres from a given point is $S = t^3 - 5t^2 + 3t + 4$. Where t is tie in seconds find;

a) The displacement of the particle at t = 5 (2 marks)

b) The velocity of the particle when t =5 (2Marks)

c) The values of t when the particle is momentarily at rest. (3marks)

d) The acceleration of the particle when t = 2. (3 Marks)

21. A baker bakes two types of cookies, marmalade cake and sweat loaves of bread. Each day he bakes x cakes and y sweat loaves of bread. The conditions of the cookies are subject to the following conditions.

$x > 20$

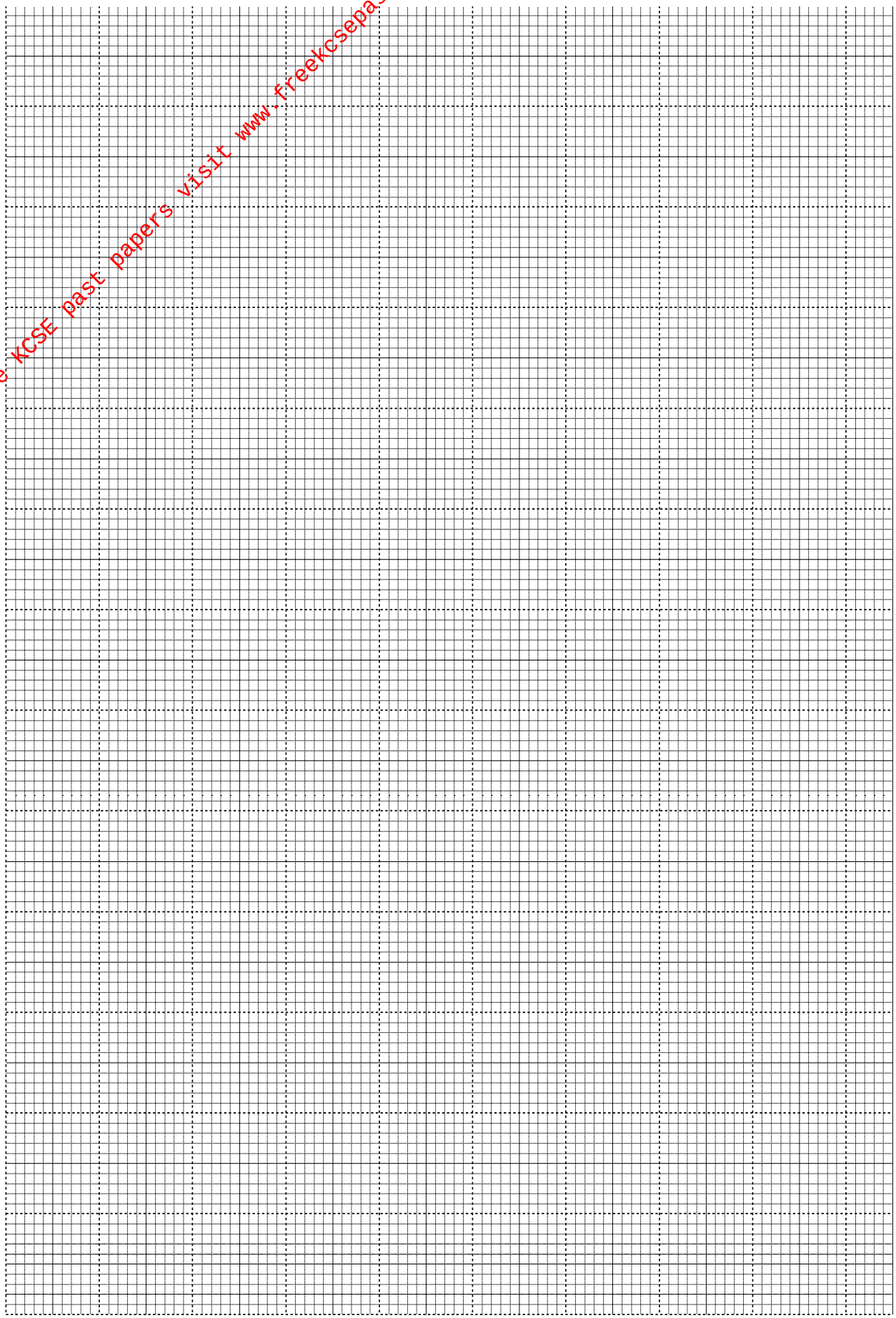
$y > 10$

$4x + 3y \leq 240$

$5x + I\,9y \geq 450$

He makes a profit of ksh 5 on each cake and ksh 6 on each loaf of bread.

a) Draw a graph to represent the above information. (6 Marks)



b) From the graph, determine how many cookies of each type he should bake to maximize his daily profit. (2 Marks)

c) Calculate the maximum profit. (2 Marks)

22. Three quantities P Q and R are such that P varies directly as the square of Q and inversely as the square root of R.

a) Given that P=20 when Q=5 and R=9, find P when Q=7 and R=25. (4mks)

b) If Q increased by 20% and R decreases by 36%, find the percentage change in P.
(4 Marks)

23. Complete the table below by filling in the blank spaces. (6 Marks)

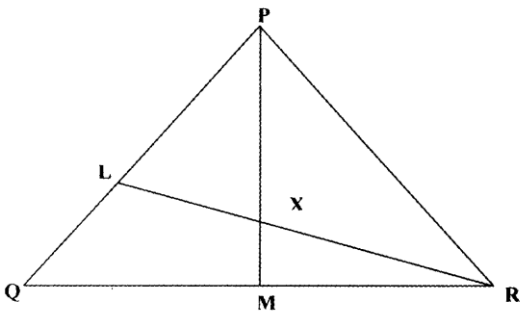
a) (3mks)

X	0	30	60	90	120	150	180	210
$Y_1 = 3 \text{ Sin } x^0 - 1$	-1	0.5						
$Y_2 = \text{Cos } x$	1	0.87	0.5			-0.87		

b) On the same axes draw the graphs of $y = 3\sin x° - 1$ and $y = \text{Cos } x°$ for $0° \leq x \leq 210°$.
(4 Marks)

c) Use the graph to solve the equation $3 \sin x^0 - \cos x = 1$ (3mks)

24. In the triangle PQR below L and M are points on PQ and QR respectively such that PL: LQ = 1:3 and QM:MR 1:2. PM and RL intersect at X. Given that PQ =b and PR =c.



b) a) Express the following vectors in terms of b and c.

i) QR

ii) PM

iii) RL

b) By taking Px = hPm and Rx = kRl where h and k are constants find two expressions of Px in terms of h k,b and c. Hence determine the values of the constant h and k.
(6 marks)

c) Determine the ratio Lx: XR (1Mark)

End