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MATHEMATICS ALT A	

121/2 MATHEMATICS ALT A PAPER 2 JULY / AUGUST 2014 TIME: 21/2 HOURS

KURIA EAST SUB-COUNTY JOINT **EXAMINATIONS COUNCIL 2014**

FOT MOTE Free KCSE Past Kenya Certificate of Secondary Education (KCSE) **MATHEMATICS** TIME: 2¹/₂ HOURS

INSTRUCTIONS TO CANDIDATES

- a) Write your Name, School and Index Number in the spaces provided at the top of this page.
- b) Sign and write the Date of examination in the spaces provided above.
- c) This paper contains TWO sections: section I and section II.
- d) Answer all the questions in Section I and only FIVE questions in section II.
- e) Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
- f) Non-programmable silent electronic calculators and KNEC mathematical tables may be used except where stated otherwise.

FOR EXAMINER'S 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



(b) Hence leaving your answer in the form of a simplified surd, simplify:- (2mks) $\frac{\sqrt{21}}{\sqrt{7} - \sqrt{3}} - \frac{\sqrt{21}}{\sqrt{7} + \sqrt{3}}$

 Grade A sugar costs sh. 75 per kg and grade B sugar costs sh. 50 per kg. Ghati mixed the two grades and sold the mixture at sh. 72 per kg. In so doing, she made a profit of 20%. In what ratio did she mix them? (3mks)

com 4. The length and breadth of a rectangular paper were measured to the nearest centimeter and found to be 18cm and 12cm respectively Find the percentage error in its perimeter. (3mks)

found to be 18cm and 12cm respectively end the percentage error in its perimet t_{te}^{te} $\sqrt{2}$ = 2t² - 4t + 10, where t is time in seconds. Determine the total distance moved by the For More Free

particle in the first 3 seconds of motion. (3mks)

6. (a) Expand and simplify the binomial expression $(2 - 4x)^5$ up to the fourth term. (1mk)

(b) Use the expansion in part (a) above to find the approximate value of $(1.96)^5$ correct to 3 decimal places. (2mks)



 The volume V of a cylinder varies jointly with its height, h and the square of its radius r. Determine the percentage increase in the volume of cylinder if its radius increases in the ratio 3:2 and its height decrease by 30%.
(3mks) 10. In the figure below, AB is a tangent to the circle centre O and radius 12cm. The area of the triangle AOB is 120cm². OXB is a straight line.



11. The figure below represents a triangular prism. The faces ABCD, ADEF and CBFE are rectangles. AB = 8cm, BC = 14cm, BF = 7cm and AF = 7cm.



Calculate the angle between faces BCEF and ABCD.

(3mks)

(4mks)

12. A group of young men decided to raise sh. 480,000 to start a business. Before the actual payment was made, four of the members pulled out and each of those remaining had to pay an additional sh. 20,000. Determine the original number of members. (4mks)

unur

(2mks)

14. The table below shows some values of the function $y = x^2 + 3$.

x	0	1/2	1	11⁄2	2	21⁄2	3	31⁄2	4	4½	5	5½	6
У	3		4	5¼	7		12	15¼	19		28		39
(a) Complete the table. (1mk)										mk)			

(b) Use the mid-ordinate with six ordinates to estimate the area bounded by $y = x^3 + 3$, the y-axis, the x-axis and the line x = 6. (2mks)

15. The table below shows the number of defective bolts from 40 samples.

No. of defective bolts (x)	0	1 per	2	3	4	5
Frequency (y)	20 20	8	6	4	1	1

Calculate the standard deviation.

(3mks)

16. Given that sum = , find without using tables; \cos^2

(2mks)

SECTION JL (50 MARKS) Answer any five guestions in this section

17. Two variables A and B are connected by the equation:

 $A = KB^n$ where k and n are constants. The table below gives values of A and B.

A	1.50	1.95	2.51et	3.20	4.50
В	1.59	2.51	N 3.98	6.31	11.5
		. ×			

(a) Find a line $\hat{\mathbf{A}}$ quation connecting A and B.

(2mks)

(b) $\sqrt{6}$ n the graph provided draw a suitable straight line graph to represent the relation in (a) $\sqrt{6}$ above. (Scale 1cm to represent 0.1 units on both axes). (5mks)



OT	
18. (a) Using a ruler and a pair of compasses only, construct triangle ABC such that AB =	AC =
4.3cm and angle ABC = 30° . (3mks)
(b) Measure BC.	1mk)
(c) A point P is always on the same side of BC as A. Draw the locus of P such that ar	ngle
BAC is always twice angle BPC	2mks)
(d) Drop a perpendicular from A to meet BC at D. Measure AD. (2mks)
(e) Calculate the area of triangle ABC. (2mks)
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For Note Free KCSB Past Papers V.	

- com 19. Veterinary researchers were experimenting a new drug on fowls in a research station. A sample of fowls which were known to have the disease was used. In this sample, 30 fowls were treated with the drug and the remaining 18 fowls were not treated.
 - (a) Calculate the possibility that a fowl selected at random from the sample is:
 - (i) treated with the drug. LSit www.free

(ii) not treated with the drug.

- For More Free KCSE Past par (b) The probability that a fowl treated with the drug will die is $1/_{10}$ while the probability that one which is not treated will die is $^{7}/_{10}$. Calculate the probability that a fowl picked at random from the sample is:
 - Treated with the sample and will die.

(ii) Not treated with the drug and will die.

(iii) Treated with the drug and will not die.

(iv) Not treated with the drug and will not die.

(2mks)

(2mks)

(2mks)

(2mks)

(1mk)

(1mk)

- com 20. The position of two towns X and Y are giveneto the nearest degree as: X(45°N, 10°E) and Y(45°N, 70°E) Find:
 - www.freekcsep (a) The difference in longitude.

(1mk)

(b) The distance between the two towns in:

x,

- (i) Kilometers (take the radius of the earth as 6371km. (3mks) For wore Free KCSE Past Past
 - (ii) Nautical miles (take 1 nautical mile to be 1.85km)

(3mks)

(c) The local time at x when the local time at y is 2.00p.m. (3mks)



- 22. Ochieng' bought a plot of land at sh. 300;000 per hectare in a town where land value appreciates at a constant rate of 10% per annum. After two years, he sold the whole plot to a customer who was willing to pay sh. 500,000 per hectare. In the transaction, Ochieng' received sh. 274,000 more than the present value of the plot. Determine:-
- L value the second sec The present land value over hectare.

(4mks)

The size of the Ochieng's plot in hectares.

(6mks)

com 23. A diet expert makes up a food product for sale by mixing two ingredients N and S. One kilogram of N contains 25 units of protein and 30 units of vitamins. One kilogram of S contains 50 units of protein and 45 units of vitamins.

The food is sold in small bags each containing at least 175 units of protein and at least 180 units of vitamins. The mass of the food product in each bag must not exceed 6kg. If one bag of the mixture contains $xkg of \mathbb{N}$ and ykg of S.

(a) Write down all the inequalities, in terms of x and y, representing the information above.



(c) If one kilogram of N costs sh. 20 and one kilogram of S costs sh. 50, use the graph to determine the lowest cost of one bag of the mixture. (3mks)

(4mks)

- com 24. (a) The first term of an Arithmetic progression (AP) is 2. The sum of the first 8 terms of the AP is 156.
 - Find the common difference of the AP. (i) (2mks) Visit www.freekcsepe

 $\sqrt{2}$ ven that the sum of the first n terms of the AP is 416, find n. (ii) (2mks) Ŷ

- FOR MORE Free KCSE Past (b) The 3rd, 5th and 8th terms of another AP form the first three terms of a Geometric Progression (GP). If the common difference of the AP is 3, find:-(4mks)
 - The first term of the GP. (i)

(ii) The sum of the first 9 terms of the GP, to 4 significant figures. (2mks)