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MATHEMATICS PAPER 1 JULY/AUGUST 2014 TIME: 2¹/₂ HOURS^Q

XISUMU WEST DISTRICT JOINT EVALUATION EXAM

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

MATHEMATICS

PAPER 1

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INSTRUCTIONS TO THE CANDIDATES

- Write your name and school and index number in the spaces provided above
- This paper contains two sections; Section 1 and Section 11.
- Answer all the questions in section 1 and any five questions from Section 11
- All necessary workings and answers **must be** written on the question paper in the spaces provided below each question.
- Marks may be given for correct working even if the answer is wrong.
- Non-calculators and KNEC Mathematical tables may be used **EXCEPT** where stated otherwise.
- Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.

FOR EXAMINERS'S USE ONLY

Section 1

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
Marks																	
Section 1	[(GRAN	D TO	FAL	
Question	17	18	19	20	21	22	13	24	Tota	ıl							
Marks																	

This paper consists of 14 printed pages. Candidates should check carefully to ascertain that all the pages are printed as indicated and no questions are missing.

SECTION A (50 MARKS)

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Answer all questions in this section

1. Evaluate without using a calculator

$$\frac{\frac{1}{4} + \frac{1}{5} \div \frac{1}{2} \text{ of } \frac{1}{3}}{\frac{1}{2} \text{ of } (\frac{4}{5} - \frac{3}{4} \div \frac{1}{2})}$$

(3mks)

For More #1---2. Simplify completely.

$$\frac{3a^2+5ab-2b^2}{b^2-9a^2}$$

(3mk)

An artisan has 63kg of metal of density 7000kg/m³. He intends to use it to make a rectangular pipe with external dimensions 12cm by 15cm and internal dimensions 10cm by 12 cm. Calculate the length of the pipe in metres. (3mks)

- Given that $Sin_{=} 2/3$ and $_{=}$ is an acute angle, find without using tables or calculators 4.
 - tan ", giving your answer in surd form. (a)

(1mk)

(2mks)

(best past papers visit (best Cos (90 - ")) For more Free 5. Four machines give out signals at intervals of 24, 27, 30 and 50 seconds respectively. At 5.00pm all the four machines give out a signal simultaneously. Find the time this will happen again. (3mks)

6. Two pipes A and B can fill an empty tank in 3hrs and 5hrs respectively. Pipe C can empty the full tank in 4 hours. If the three pipes A, B, and C are opened at the same time, find how long it will take for the tank to be full. (3mks)

7. A tourist arrived in Kenya with Sterling pound (£) 4680 all of which he exchanged into Kenyan money. He spent Ksh. 51,790 while in Kenya and converted the rest of the money into U.S dollars. Calculate the amount he received in U.S dollars. The exchange rates were as follows.

ete	Buying	Selling.	
US \$ ⁰⁴	65.20	69.10	
Sterling Pound	(£) 123.40	131.80	(4mks)
FOT NOTE Free KCSE			

8. The gradient of a straight line L_1 passing through the points P(3, 4) and Q(a, b) is $^{-3}/_{2}$. A line L_2 is perpendicular to line L_1 and passes through the points Q and R(2, -1). Determine the values of a and b. (4mks)

 9.
 Determine the quartile deviation of the set of numbers below.
 (2mks)

 8, 2, 3, 7, 5, 11, 2, 6, 9, 4
 (2mks)

10. The distance from a fixed point of a particle in motion at any time **t** seconds is given by $S = t^3 - \frac{5}{2}t^2 + 2t + 5$ metres. Free Find it's;

(a) Acceleration after **t** seconds

 $e^{e^{t}}$ (b) Velocity when acceleration is zero.

11. Without using tables or calculators, find the value of **t** in $\log_8(t+5) - \log_8(t-3) = \frac{2}{3}$

12. Use the tables of cube roots, squares, and reciprocals to evaluate the following correct to 4 s.f

(3mks)

(1mk)

(2mks)

(3mks)

$$\frac{3}{(0.0136)^3}$$
 – $\frac{2}{(3.72)^2}$

13. Three years ago John was four tames as old as his son Peter. In five years time the sum of their ages will be 56. Find their present ages. (3mks)

14. The Find the inverse of the matrix $\begin{pmatrix} 1 & 1 \\ 3 & 1 \end{pmatrix}$. Hence determine the point of intersection of the lines. (4mks) y + x = 73x + y = 15

15. The volumes of two similar solids are 800cm^3 and 2700cm^3 . If the surface area of the larger one is 2160cm^2 , find the surface area of the smaller figure. (3mks)

16. Find the number of sides of a regular polygon whose interior angle is five times the exterior angle. (3mks)

$\frac{Freekcae Past Paperts}{SECTION II (50 MARKS)}$

(a) Complete the table below for the equation $y = x^2 + 3x - 6$ given $-6 \le x \le 4$ 17.

(2mks)

x	-0	- 3 3	-4	-3	-2	-1	0	1	2	3	4
У	Pat	2									
	and the second s										
(b) U	sing a so	cale of 1	cm to re	present	2 units in	both ax	kes; dra	w the g	raph of	$y = x^2 +$	-3x - 6
see											
Y											

(i)
$$x^2 + 3x - 6 = 0$$

(2mks)



(d) A_3 (6, -6), B_3 (2, -3) and C_3 (6, -3) is the image of $A_2 B_2 C_2$ after a transformation P plot $A_3B_3C_3$ and describe the transformation. (2mks)

- (e) Describe fully a single transformation that would have mapped ABC to $A_3B_3C_3$.
- The figure below shows a triangle **ABC** inscribed in a circle. AC = 10cm, BC = 7cm and 19. $\mathbf{AB} = 10$ cm.



(a) Find the size of angle **BAC**.

(b) Find the radius of the circle.

(c) Hence calculate the area of the shaded region.

(2mks)

(2mks)

(6mks)

(2mks)

20. The figure below shows a cross-section of a bottle. The lower part ABC is a hemisphere of radius 5.2cm and the upper part is a frustrum of a cone. The top radius of the frustrum is one third of the radius of the hemisphere. The hemispherical part is completely filled with water as shown.



When the container is inverted, the water now completely fills only the frustrum part.

(a) Determine the height of the frustrum.

(6mks)

(b) Find the external surface area of the bottle.

(4mks)

21. In the figure below, **ABCD** is far trapezium. **AB** is parallel to **DC**, diagonals **AC** and **DB** intersect at **X** and **DC** = 2**AB**, **AB** = **a**, **DA** = **d**, **AX** = **kAC** and **DX** = **hDB**, Where **h** and **k** are constants.



(1mk)

(2mks)

(ii) **AX**.

(iii) DX .	(1mk)
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- (b) Determine
 - (i) The values of \mathbf{h} and \mathbf{k} . (5mks)

(ii) The ratio in which **X** divides **BD**.

(1mk)

				e.Past	papert						
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plete th	ne table l	below	for the	e functi	$\log y = x^2$	+3					(2r
1	1.5	2 ^{1¹¹}	2.5	3	3.5	4	4.5	5	5.5	6	
4	J ^{j2}	7			15.25	19		27		39	
	1plete th	1 1.5	$\frac{1}{4}$	plete the table below for the $1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1.5 \\ 2^{3} \\ 2.5 \\ 2.5 \\ 2.5 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1.5 \\ 7 \\ 1 \\ 1 \\ 1.5 \\ 7 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1$	plete the table below for the function $1 = 1.5$ $2^{30}$ $2.5$ $3$ $4$ $3^{12}$ $7$ $1$	The probability of the function $y = x^2$ 1 1.5 2 ³ 2.5 3 3.5 4 3 ² 7 15.25	aplete the table below. For the function $y = x^2 + 3$ 1       1.5 $2^{x^{x^{y^{y^{y^{y^{y^{y^{y^{y^{y^{y^{y^{y^{y^$	aplete the table below. For the function $y = x^2 + 3$ 1       1.5 $2^{x^{y^{y^{y^{y^{y^{y^{y^{y^{y^{y^{y^{y^{y^$	aplete the table below. For the function $y = x^2 + 3$ 1       1.5 $2^{x^{y^{y^{y^{y^{y^{y^{y^{y^{y^{y^{y^{y^{y^$	aplete the table below. For the function $y = x^2 + 3$ 1       1.5 $2^{n}$ $2.5$ $3$ $3.5$ $4$ $4.5$ $5$ $5.5$ 4 $y^2$ $7$ 15.25 $19$ $27$	aplete the table below. For the function $y = x^2 + 3$ 1       1.5 $2^{n}$ $2.5$ $3$ $3.5$ $4$ $4.5$ $5$ $5.5$ $6$ 4 $y^2$ 7       15.25       19       27 $39$

(b) Use the shid-ordinate rule with five strips to estimate the area bounded by the curve, the line  $x \neq 0^{2}$  and the line x = 6. (2mks)

(c) Use integration to find the exact area in (b) above.

(3mks)

(d) Calculate the percentage error arising from the use of mid-ordinate rule. (3mks)

23. Four cities **A**, **B**,**C**, and **D** are such that town **B** is 1500km due East of town **A**. Town **C** is 1800km due North of town **B**. Town **D** is on a bearing of  $330^{\circ}$  from town **A** and on a bearing of  $300^{\circ}$  from **C**.

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(a) Use a ruler and compasses only to show the position of town **A**, **B**, **C**, **D** (Take a scale of 1cm = 300km)

- (b) Determine
  - (i) The distance **AD**.
  - (ii) The distance **CD**
  - (iii) The bearing of town **D** from town **B**.

(2mks)

(5mks)

(2mks)

(1mk)

- 24. A car leaves town X from town Y for town X at an average speed of 70km/h at 8.00am. At the same time a bus leaves town Y for town X at an average speed of 50km/hr. At 8.15am, a cyclist leaves town Y for town X at an average speed of 30km/hr.
  - (a) Calculate the time when the bus meets the car.
- the core of the co

(c) If the bus upon reaching town X rests for 10 minutes then starts its journey back to Y, calculate how far from X the bus meets the cyclist.
 (3mks)

(3mks)

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