Name_____ Index No_____

121/1
MATHEMATICS
PAPER 1
JULY/AUGUST 2009
2 ½ HOURS

THE BARINGO - KOIBATEX DISTICTS EDUCATIONAL IMPROVEMENT EXAMINATIONS

Kenya Certificate of secondary Education
121/1
Mathematics
Paper 1
July/August – 2009
2 ½ hours

Answer all questions from this section

1. Evaluate

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

2. A trader had a bag of rice, when he picked the rice in 6kg packets; he had 1 kg left over. When he packed the rice in 8 kg packets, again he had 1 kg lefty over. When he packed the rice in 9 kg packets, he had 1 kg left over. What is the smallest amount of rice that he must have had. (3 marks)

3. Factorize

   $X^2 - y^2$ (1 mark)

   Hence, find the exact value of

   $1557^2 - 1547^2$ (2 marks)

4. What is the density of an alloy made by mixing 51g of metal A density 17g/cm^3 with 15g of metal B density 3 g/cm^3 (3 marks)

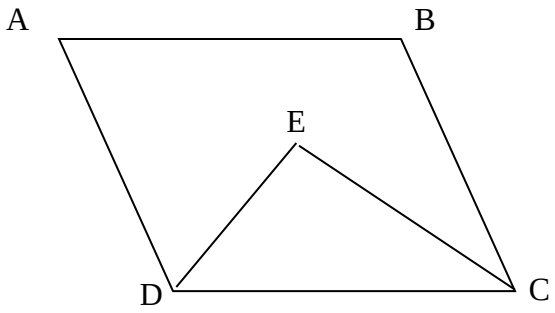
5. A line L_1 is perpendicular to the line L_2, whose equation is $4y - 8x - 3 = 0$ and passes though a point A(3,2). Find the equation of L_1 leaving your answer in the form $ax + by = c$ (3 marks)

6. A tourist arrived in the country with US$ 2000 which he changed in Kenya shilling. He spent Kshs 75,000 on hotel accommodation and Ksh. 40,000 on travel and other expenses. He changed the remaining money into starling pounds. If he did all his money transactions based on the bank rates shown below, how much money in £ did he remain with? Give answer to 2.d.p (4 marks)

BANK	CURRENCY		
		$	£
	BUY	78.45	120.27
	SELL	78.95	121.04

7. Two similar cylindrical are such that larger one has a capacity of 810 litres and the smaller one has a capacity of 240litres. If the height of the smaller one is 1.2 metres, find the height of the larger tank. (3 marks)

8. In the figure below ABCD is a rhombus and Δ CDE is an equilateral triangle. Given angle ECB = 20^0 find the size of angle AEV (3 marks)



9. Determine the values of X that satisfy the following inequalities and show on a number line $-3 - x \leq {}^{1}/_{3}\, x - 5 > {}^{2}/_{3}\, x - 6$ (4 marks)

10. Solve for x in the equation (2 marks)

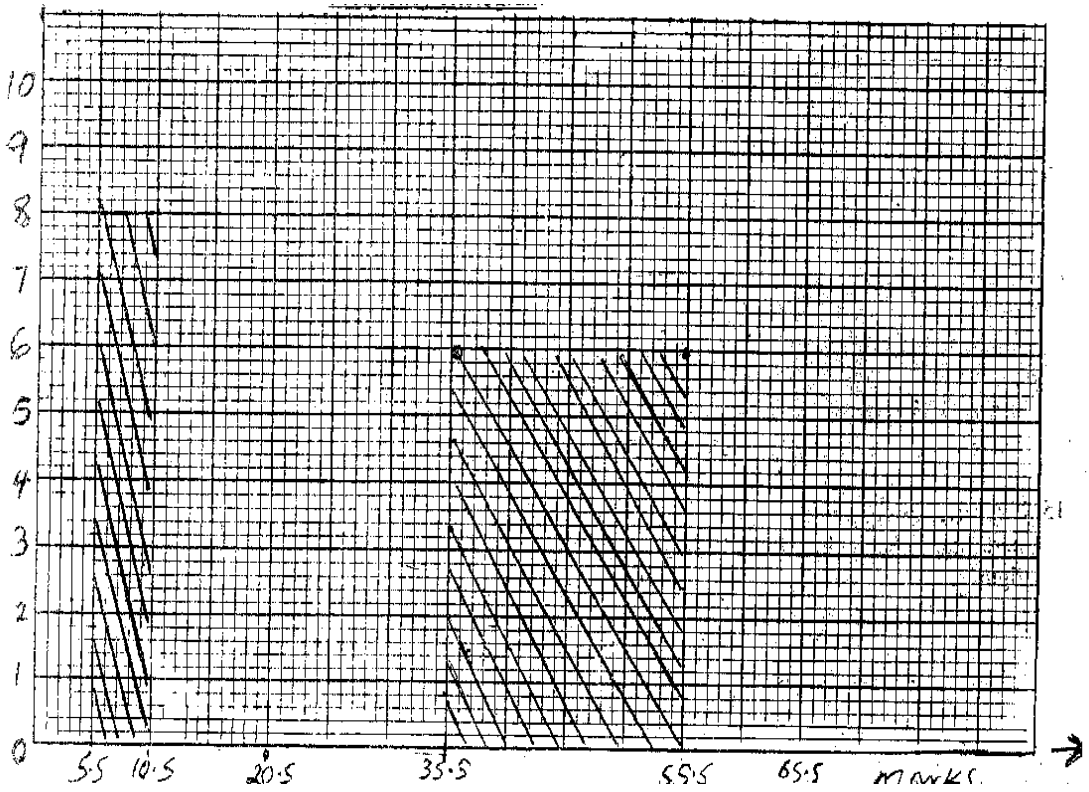
$2^{(3x-1)} \times 8^{(x-1)} = 256$

11. A Histogram is drawn from the set of date given below. Complete the missing Bars

Marks	6-10	11-20	21-35	36-55	56-65
Frequency	8	14	18	24	10

(3 marks)

Frequency Histogram



12. Grade X of Tobacco costs sh. 81.50 per kg and grade Y cost sh. 109 per kilogram. In what ratio must the two grades be mixed in order to make a profit of 20% when the mixture sell at sh 112.80 per kg (4 marks)

13. Two towns P and Q are on the latitude 50^0 N such that Q is 2100nm east of P. calculate

    (a) The longitude difference between P and Q

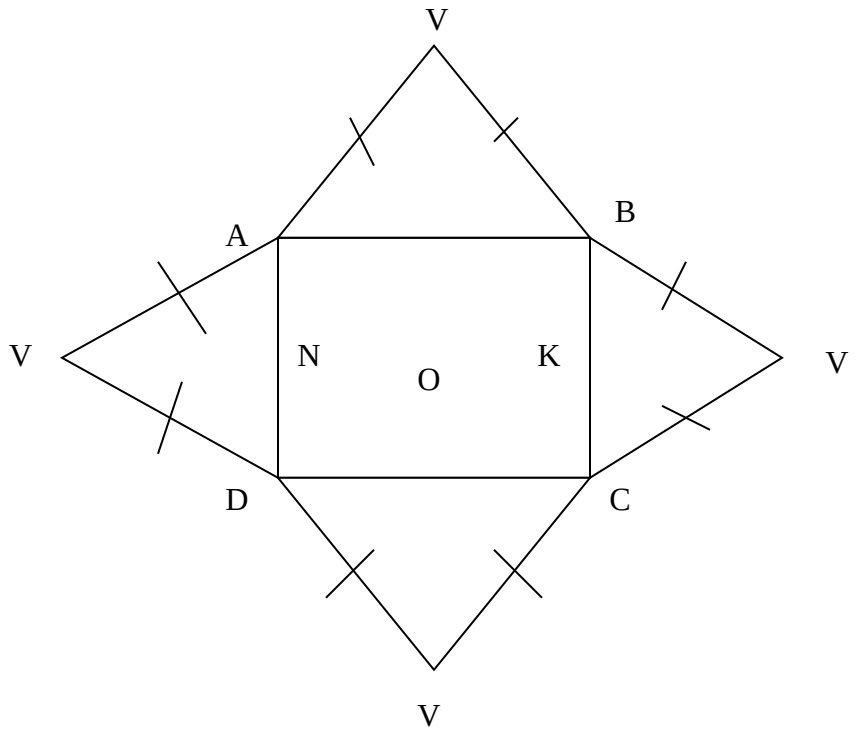
    (b) The local time at P if the local time at Q is 1.00p.m (2 marks)

14. Evaluate using reciprocal, square and square roots tables only. (4 marks)

$$\sqrt{\frac{(445.1\times10^{-1})^2+1}{0.07245}}$$

15. If Z varies directly as the square of x and inversely as the square root of y. Find the percentage change in Z if x increases by 20% and y decreases by 21% to significant figures (2 marks)

16. The figure below shows the net of a rectangular based pyramid. The rectangle measure 18cm by 15 cm. N and K are the mid- points of AD and BC respectively. AB = 18cm and BC = 15 cm, VK = 16 cm, V is the vertex and O is the centre of the rectangles ABCD.



(a) Sketch the pyramid and label all the vertices (1 mk)

(b) From diagram (a) above, calculate to 2 d.p the length of CV (2 marks)

SECTION II (50 MARKS)

Answer any five question from this section

17. Mary is a sales executive earning a salary of kshs 20,000 and a commission of 8% for the sales in excess of kshs 100,000.
    If in April she earned a total of Kshs 48,000 in salaries and commission (4 marks)
    (a) Determine the amount of sales she made in that month (4 marks)

    (b) If the total sales in the months of May and June increased by 18% and then dropped by 30% respectively, calculate
    (i) Mary's commission in the months of May (3 marks)

(ii) Her total earnings in the month of June (3 marks

18. Triangle ABC, with vertices A(1,3), B(1,1) and C (2, 1) is given a half – turn about (2,0) to $A^1B^1C^1$. The image is then given a half turn- about (0,0) to map onto $A^{II}B^{II}C^{II}$

(a) find (i) the co-ordinates of A'B'C' (2 marks)

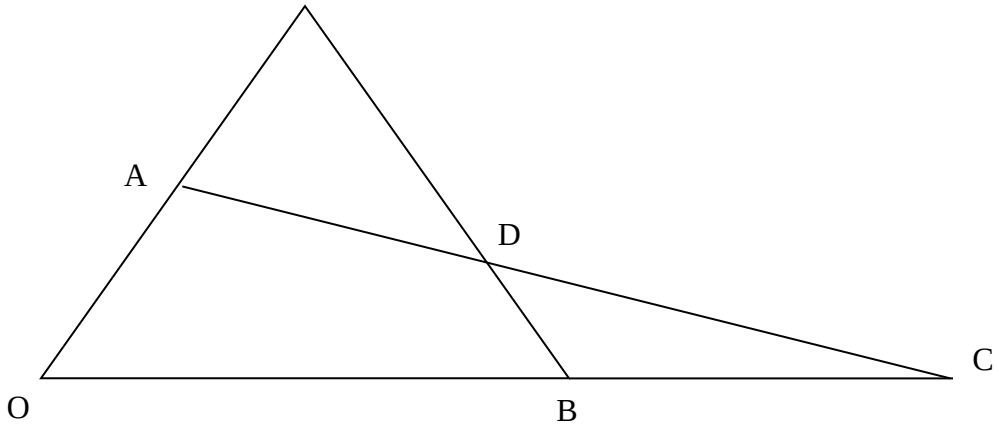
(ii) Matrix M which maps $A^1B^I C^I$ onto $A^{II}B^{II}C^{II}$ (2 marks)

(iii) The co-ordinates of A^{II} B^{II} and C^{II} (2 marks)

(b) Draw $A^1B^IC^I$ and on the same axes (2 marks)

(c) identify a single transformation that maps ABC onto $A^{II}B^{II}C^{II}$ (2 marks)

19. In the figure below $\overrightarrow{OA} = a$ $\overrightarrow{OB} = b$ OA: : AE = 2:3 OB: OC= 1:2



(a) Express $\overrightarrow{AC}$ and $\overrightarrow{BE}$ in terms of a and b

(i) $\overrightarrow{AC}$

$\overrightarrow{\quad}$

(ii) BE

(b) If $\overrightarrow{DC} = k\overrightarrow{AC}$ and $\overrightarrow{BD} = \overrightarrow{BD} = m\overrightarrow{BC}$ where k and m are scalars. By expressing $\overrightarrow{DC}$ in two ways, determine the values of k and m (5 marks)

(c) Find the ratio of $\overrightarrow{BD}$: $\overrightarrow{DE}$ (2 marks)

20. The displacement s metres of a particle moving a long a straight line after t second is given by S = $6t\,\frac{t^3}{3} - \frac{t^2}{2}$ (3 marks)

(a) Find its initial acceleration

(b) Calculate:

(i) The time when particle was momentarily at rest (3 marks)

(ii) Its displacement by the time it comes to rest momentarily (2 marks)

(c) Calculate the maximum speed attained (2 marks)

21. Two aircrafts A and B leaves airport at the same time. A flies on a bearing of 240^0 at 900km/h. while B flies due east at 750 km/hr

(a) Using a scale of 1cm to represent 100km, make a scale drawing to show the relative positions of the aircrafts after 40 minutes (5 marks)

(b) Use the scale drawing to fine the distance between the two aircrafts after the 40 minutes (3 marks)

(c) Determine the bearing of

(i) A from B (1 mark)

(ii) B from A (1 mark)

22. A shop is stocked with plates which come from two suppliers A and B. They are bought in ratio of 3:5 respectively. 10% of plates from A are defective and 6% of plates from B are defective.

(a) A plate is chosen by a buyer at random
Find the probability that
(i) it is from A (1 mark)

(ii) It is from B and it is defective (2 marks)

(iii) It is defective (2 marks)

(b) Two plates are chosen at random. Find the probability that
(i) Both are defective (3 marks)

(ii) At least one is not defective (2 marks)

23. A matatu left A at 8.00 am and traveled towards B, 406 km away at a speed of 84km/h. One and a half hours later, it made a 30 minute stop over at a town M before proceeding at the same speed. A bus left town B towards A at 56 km/h at 10.00am

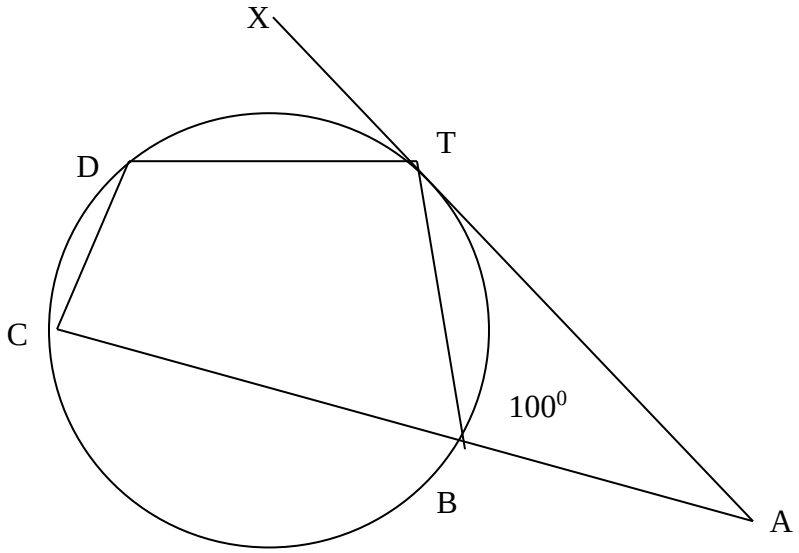
Determine:

(a) How far town M is from (2 marks)

(b) Calculate how far from B, the two vehicles meet (6 marks)

(c) At what time does the matatu arrive at B (2 marks)

24. In the diagram below ATX is a tangent to the circle at point T ABC is a straight line $<ABT = 100^0$ $<XTD = 58^0$ and line AB = line BT



Find, giving the values of angle

(a) TDC (2 marks)

(b) TCB (2 marks)

(c) TCD (2 marks)

(d) BTC (2 marks)

(e) DTC