Name _____ Index No. _____

Candidate's Signature _____

Date _____

121/1
MATHEMATICS
PAPER 1
JULY/AUGUST 2013
2 ½ HOURS

MATUNGULU DISTRICT FORM 4 MULTILATERAL EXAM – 2013
Kenya Certificate of Secondary Education
MATHEMATICS
PAPER 1
2 ½ HOURS

INSTRUCTIONS TO CANDIDATES

1. Write your name and index number in the space provided above.
2. This paper contains TWO sections; section I and II.
3. Answer ALL the questions in section I and only five questions from section II.
4. Show all the steps in your calculations giving your answers at each stage in the space provided in each question.
5. Marks may be given for correct working even if the answer is wrong.
6. Non-programmable silent calculators and KNEC Mathematics tables may be used.

FOR EXAMINER'S USE ONLY

SECTION 1

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

This paper consists of 18 printed pages

Turn Over

SECTION 1 (50 MARKS)

Answer all questions from this section.

1. Simplify

$$\frac{2y^2 - 3xy - 2x^2}{4y^2 - x^2}$$ (3 marks)

2. A saleman earns a basic salary of Kshs. 19,000 per month. In addition, he earns a commission of 5% for all sales above Ks. 20,000. In February 2011, he sold goods worth 115,000. Calculate his total earnings that month. (3 marks)

3. Use reciprocal tables to find the value of x if $\frac{1}{x} + \frac{4}{0.0125} = \frac{5}{0.004236}$ (4 marks)

4. Mr. Owino spends ¼ of his salary on school fees. He spends $^{2}/_{3}$ of the remainder on food and a fifth of what is left on transport. He saves the balance. In a certain month he saved sh. 3,400. What is his salary? (3 marks)

5. Denis on arrival to Kenya to play for the country against Nigeria converted 6000 Euros into Kenya shillings. During his three day's stay he spent Ksh. 260,000. He converted the remaining amount into US dollars. How many US dollars did he get?

(Use the exchange rate below)

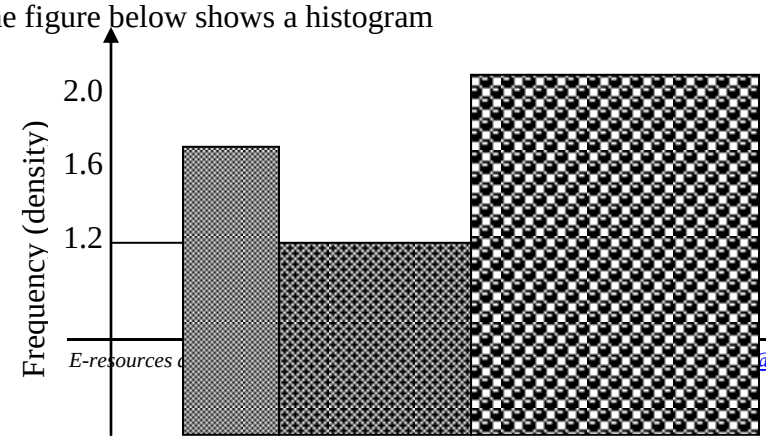
	Buying	Selling
1 US dollar $	96.20	96.90
1 Euro C	112.32	112.83

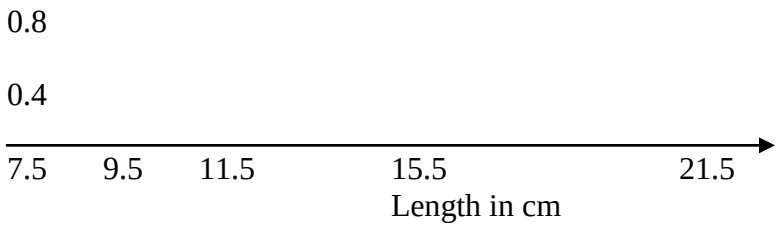
(3 marks)

6. In the figure below, AC is an arc of a circle centre B, angle ABD = 60^0, AB = BC = 7cm and CD = 5cm. If AE is parallel to BD and AB is parallel to ED.

   Calculate the area of the shaded region. (3 marks)

7. The figure below shows a histogram



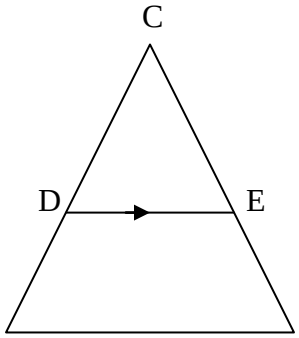


Complete the frequency distribution table below. (3 marks)

Length x cm	Class width	Frequency density	Frequency
$7.5 \leq x < 9.5$		1.2	24
$9.5 \leq x < 11.5$			
$11.5 \leq x < 15.5$			
$15.5 \leq x < 21.5$			

8. Without using tables or calculator evaluate $\log_2 (x^2 - 9) = 3 \log_2 2 + 1$ (3 marks)

9. Triangle ABC below, AC = BC, AB is parallel to DE,AB = 15cm, DE = 7.5cm and BE = 6cm.



A → B

Calculate

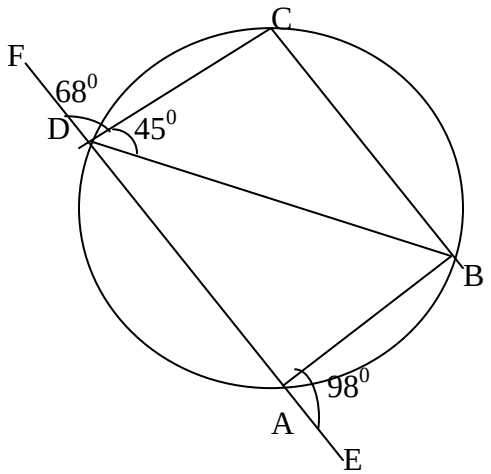
(a) Length CE

(b) Area of quadrilateral ABED. (4 marks)

10. A bus and a car leave Nairobi at 7.30am and 9.30am respectively. If their speeds are 60km/h and 100km/h respectively, find the time when the car catches up with the bus. (3 marks)

11. A square whose vertices are P(1, 1), Q (2, 1), R (2, 2) and S (1, 2) given an enlargement with centre at (0, 0). Find the images of the vertices if the scale factor is 3. (2 marks)

12. In the figure below, ABCD is a cyclic quadrilateral and BD is a diagonal. EADF is a straight line. $\angle$ CDF = 68^0, $\angle$BDC = 45^0 and $\angle$BAE = 98^0.



Calculate the size of

(a) $\angle$ABD (2 marks)

(b) $\angle$CBD (2 marks)

13. The length of a rectangle is increased by 20% while the width is decreased by 10%. Find the percentage change in area. (2 marks)

14. A curve passes through a point (2, 0) and its gradient function is $3x^2 - \frac{1}{x^2}$. Find the equation of the curve. (3 marks)

15. Sixteen men working at the rate of 9hrs a day can complete a piece of work in 14 days. How many more men working at the rate of 7 hours a day would complete the same job in 12 days.

(3 marks)

16. Find the equation of a perpendicular bisector to a line AB whose coordinates are A(1, 10) and B(5, 2) (4 marks)

SECTION II (50 MARKS)

Answer only five questions in this section.

17. An unskilled worker may either walk to work along a route 5km to take a bus journey of 7km. The average speed of the bus is 24km/hr faster than his average speed. Taking the average walking speed as xkm/hr;

(a) Write down expressions for time of the journey;

(i) When walking (2 marks)

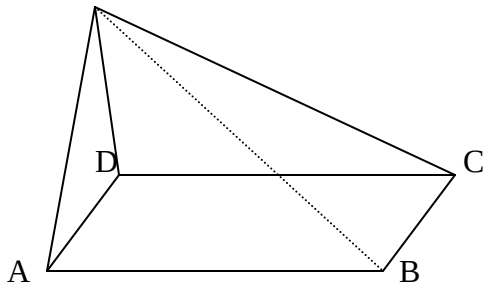
(ii) When using the bus (2 marks)

(b) The journey by bus takes 36 minutes less than the journey on foot, find his walking speed. (4 marks)

(c) Hence find the time he takes to walk to work. (2 marks)

18. The diagram below is a right pyramid on a rectangular base.

V



Given that the volume of the solid is $280m^3$ and its base area is $60cm^2$ and that AB : BC = 3 : 5, determine

(i) The height of the pyramid (2 marks)

(ii) The length and width of the base. (4 marks)

(iii) The slant edge of the pyramid. (4 marks)

19. The table below shows the values of x and some values of y for the curve $y = x^3 + 3x^2 - 4x - 12$ in the range $-4 \leq x \leq 2$.

(a) Complete the table by filling in the missing values of y. (2 marks)

X	-4	-3.5	-3	-2.5	-2.0	-1.5	-1.0	-0.5	0	0.5	1.0	1.5	2.0
Y		-4.1		1.1		-2.6		-9.4		-13.1		-7.9	

(b) On the grid provided draw the graph of $y - x^3 + 3x^2 - 4x - 12$ in the range $-4 \leq x \leq 2$ (4 marks)

(c) By drawing a suitable straight line on the same grid solve the equation $x^3 + 3x^2 - 5x - 6 = 0$ (4 marks)

20. The figure below shows two intersecting curves with the centres as A and B and each radii as 8.4cm and 6.3cm respectively. The angles subsended at the centres by the minor arc XY are 60^0 and 90^0 respectively. The straight line XY is a common chord. T is the point of intersection of AB and XY.

X A B Y 60^0 90^0 6.3cm 8.4cm

Find

(a) The length of the straight lines

(i) XY (2 marks)

(ii) AB (4 marks)

(b) The area of the shaded region. (4 marks)

21. A particle moves in a straight line such that its velocity VMs is given by :
$V = 32 + 4t - t^2$ after t seconds.

Calculate;

(a) Its initial velocity (2 marks)

(b) The acceleration when it comes to rest. (4 marks)

(c) the distance traveled in the seventh second. (4 marks)

22. The ages of 100 people who attended a wedding were recorded in the distribution table below

Age	0 – 19	20 – 39	40 – 59	60 – 79	80 - 99
Frequency	7	21	38	27	7

Draw the cumulative frequency (5 marks)

(b) From the curve determine

(i) Median (1 mark)

(ii) Inter quartile range (2 marks)

(iii) 7th Decile (1 mark)

(iv) 60th Percentile (1 mark)

23. Three Kenyan warships A, B and C are at sea such that ship B is 450km on a bearing of 030^0 from ship A. Ship C is 700km from ship B on a bearing of 120^0. An enemy ship D is sighted 1000km due South of ship B.

(a) Taking a scale of 1cm to represent 100km locate the position of the ships A, B, C and D. (4 marks)

(b) Find the compass bearing of:

(i) Ship A from ship D (1 mark)

(ii) Ship D from ship C (1 mark)

(c) Use the scale drawing to determine

(i) The distance of D from A. (1 mark)

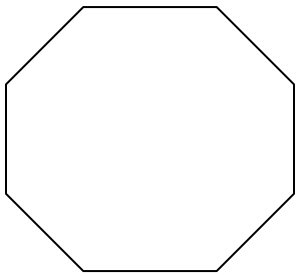
(ii) The distance of C from D (1 mark)

(d) Find the bearing of:

(i) B from C (1 mark)

(ii) A from C (1 mark)

24. The figure below shows a cross section of a regular octagonal based prism of sides 10cm. The length of the prism is 50cm.



Find

(a) The total surface area of the prism (5 marks)

(b) The capacity of the prism in litres. (3 marks)

(c) The radius of a cylinder that can exactly fill the prism if the cylinder has a height of 28cm. (2 marks)

ANSWERS:
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