

NameAdm. No.....
 School.....Candidate's Signature.....
 Date.....

BUNYORE – MARANDA JOINT ENROLMENT EXAMINATIONS 2013

121/1
MATHEMATICS
Paper 1
January/February
2½ Hours

INSTRUCTIONS TO CANDIDATES

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

FOR EXAMINERS 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

SECTION 1 (50 MARKS)

Answer all the questions in this section

1. Evaluate

$$\frac{18 \div 3 \text{ of } (-2) \times 8 \div 24}{-4 \div 6 \times 2}$$

(3mks)

2. Solve for x in the equation

$$27^{x-1} \times 2^y = 432$$

(3mks)

3. Given that $\mathbf{OA} = 5\mathbf{i} - 3\mathbf{j}$ and $\mathbf{OB} = 3\mathbf{i}$. Find the magnitude of \mathbf{AB} to one decimal place (3mks)

4. The distance between points P and Q on a section of a straight road is 12km. Mukai and Mutua left points P and Q respectively at the same time and moved towards each other at 1m/s and 1.5m/s respectively. Calculate

a) Their relative speed (1mk)

b) The time they will take before meeting (2mks)

5. Use reciprocal tables to find the reciprocal of 0.02674, hence evaluate to 2s.f. (3mks)

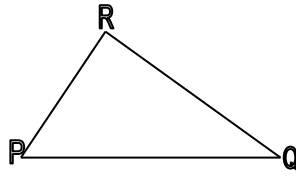
$$\sqrt{\frac{0.4096}{0.02674}}$$

6. The image of P (5,5) under an enlargement scale factor 2 is p'(8,7). Find the coordinates of the centre of enlargement (4mks)

7. An open rectangular box measures externally 32cm long, 27cm wide and 15cm deep. If the box is made of wood 1cm thick, what volume of wood is used? (3mks)

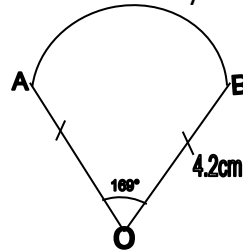
8. A security guard observes that the angle of elevation to the top of an observation tower is 36° , if he walks 65m towards the base of the tower; the angle becomes 57.5° . Calculate the height of the tower? (4mks)

9. On the triangle PQR, draw a circle touching PR, QP produced and QR produced (3mks)



10. Find the perimeter of the figure below. Give your answer correct to four significant figures.

(Take $\pi = \frac{22}{7}$)



(3mks)

11. A line L passes through P (8,6) and is perpendicular to the line $3y + 2x + 6 = 0$. Find the equation of line L and write it in the form $y = mx + c$. (3mks)

12. Expand and simplify the expression $(2x^2 - 3y^3)^2 + 12x^2y^3$ (2mks)

13. Solve for P given that, $\log_2(2p + 3) - 2 = \log_2(p - 2)$ (3mks)

14. Given that $\cos(90 - x)^\circ = \frac{1}{\sqrt{5}}$, find $\tan x$ (2mks)

15. A Forex Bureau in Kenya buys and sells foreign currencies as shown below:

	Buying	Selling
Currency	(Ksh)	(Ksh)
Swiss Franc	12.34	12.38
Japanese Yen	11.28	11.37

A businesswoman from Switzerland converted 295 250 Swiss franc into Kenyan Shillings

(a) Calculate the amount of money, in Kenya shillings, that she received (1mk)

- (b) While in Kenya, the businesswoman spent Ksh. 2 258 000 and then converted the balance to Japanese Yen. Calculate the amount of money, to the nearest Japanese Yen, that she received (3mks)

16. Two similar cylinders have the ratio of the areas as 9:25. Given that the bigger cylinder has a volume of 750cm^3 , calculate the volume of the smaller cylinder. (3mks)

SECTION II

Answer only five questions from this section

17. a) Mr. Mulei operates two passenger service vehicles along the Nyeri-Nairobi route. One is a 16-seater matatu and the other an 8-seater Peugeot 504. Each vehicle makes one route trip per day, and the charges are ksh. 250 and ksh. 300 per passenger respectively (one way). The matatu uses diesel which cost ksh. 48 per litre and the Peugeot 504 uses regular petrol which costs ksh. 52 per litre. The fuel consumption of the two vehicles is in the ratio 4:3 respectively.
- a) If the matatu uses 80 litres for the round trip, determine the fuel consumption of the Peugeot 504 for the round trip (2mks)
- b) Calculate the daily collection for each vehicle (2mks)
- c) Determine which vehicle is more profitable (on a daily basis) and by how much. (other factors being constant). (3mks)
- d) If the prices of both types of fuel go up by 20%, determine the percentage change in the daily collection (3mks)

18. Four towns K,L,M and N are such that L is 94km directly to the North of K and M is on a bearing of 295° from K at a distance of 60km. N is on a bearing of 310° from M and at a distance of 42km, using a scale 1:1000000.

a) Make an accurate scale drawing to show the relative scale positions of the towns
(4mks)

b) Find the distance and the bearing of L from M
(2mks)

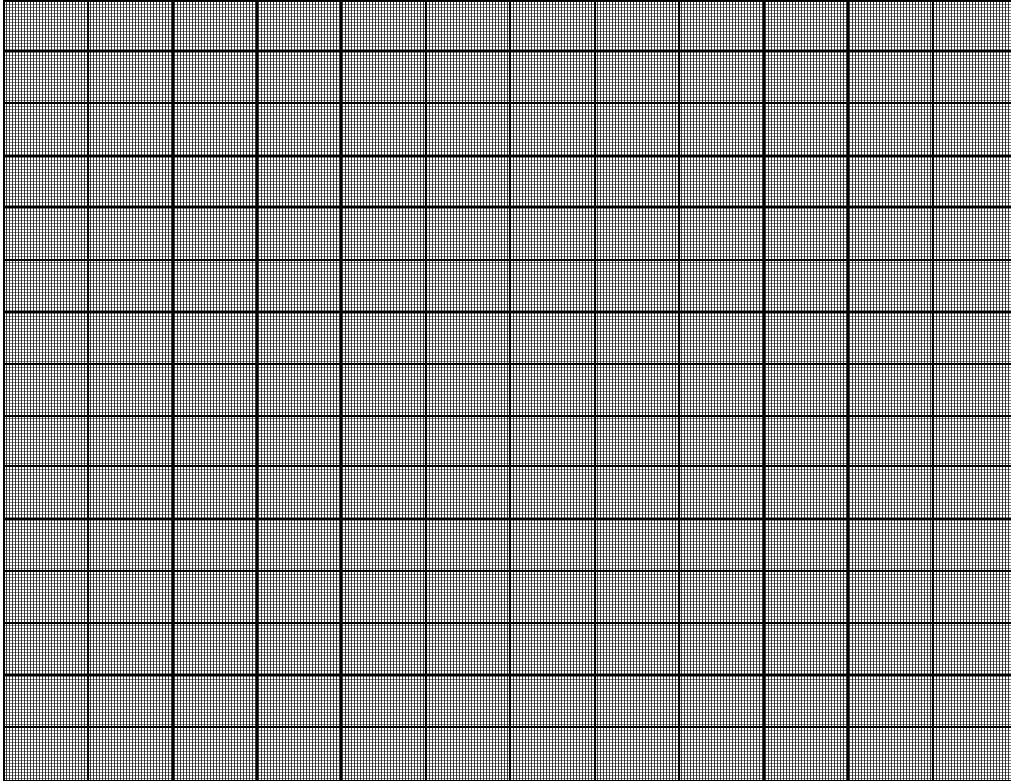
c) Find distance and bearing of N from L
(2mks)

d) Find the distance and bearing of K from N
(2mks)

19. The co-ordinates of the vertices of a triangle PQR are P (0,4), Q(2,0) and R(4,6). The vertices of its image under a rotation are P'(5,1)Q'(1,-1)and R'(7,-3).

(a) (i) On the grid provided, draw PQR and its image P'Q'R'

(2mks)



(ii) By construction, determine the centre and angle of rotation

(3mks)

(c) On the same grid as (a) (i) above, draw P''Q''R'', the image of P'Q'R' under a reflection in the line $y = x$

(2mks)

(i) Draw the line of symmetry of triangle PQR

(1mk)

(ii) Write down the equation of the line

(2mks)

20. The frequency distribution table below represents the number of kilograms of meat sold in butchery.

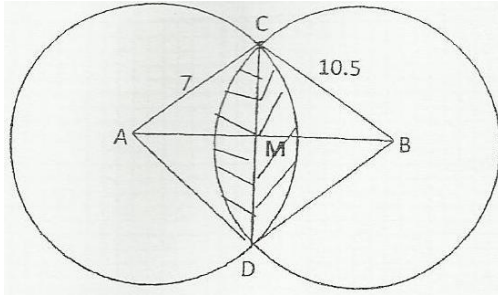
Mass in kg	1-5	6-10	11-15	16-20	21-25	26-30	31-35
Frequency	2	3	6	8	3	1	1

a) State the modal frequency. (1mk)

b) Calculate the mean mass to 2 decimal places (6mks)

(c) Calculate difference between the median and mass and the mean mass. (3mks)

21. The figure two intersection circles with centre A and B and radii 7cm and 10.5 cm respectively.
The distance between AB – 14 and AM:MB-3:4



Calculate to four significant fig the;

- a) Size of angle CAD (3MKS)

- b) Size of angle CBD. (3mks)

- c) Area of shaded region (use $\pi = 3.142$). (4mks)

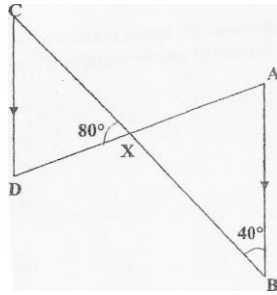
22. In an n-sided polygon two angles are right angles and each of the remaining angles is 150°

a) Find the value of n hence the sum of interior angles of this polygon. (4mks)

b) Name the polygon (1mks)

c) Find the areas of a regular octagon of sides 4cm o 5sf. (5cms)

23. In figure below, AB is parallel to CD. The lines AD and CB intersect at X. $CB = CX:XB=3:1$, $\angle ABX=40^\circ$ and $\angle CXD = 80^\circ$



- (a) Find the length of CX (2mks)

- (b) Determine, correct to 2 significant figures:

- (i) The perpendicular distance between AB and CD. (2mks)

- (ii) The length of XD (2mks)

- (c) Using the cosine rule, find the length of CD correct to 2 significant figures. (2mks)

- (d) Calculate, correct to one decimal place, the area of triangle CXD. (2mks)

24. The cost C , of producing n items varies directly as n and partly as the inverse of n . to produce two items it costs Ksh. 135 and to produce three items it costs Ksh. 140

(a) The constant of proportionality and hence write the equation connecting C and n (5mks)

(b) The cost of producing 10 items; (2mks)

(c) The number of items of produced at a cost of Ksh. 756. (3mks)