Name……………………………………………….. Adm No……………………………..

School……………………………………………… Candidate's sign…………………….

Date……………………………………..

MATHEMATICS
Paper 1
2 ½ Hours

Kenya Certificate of Secondary Education
Form 2

Instructions to candidates.
1. *Write your name and index number in the spaces provided above.*
2. *Sign and write the date of examination in the space provided above.*
3. *The paper contain two sections: **Section I and section II***
4. *Answer **All** the questions in **section I** and **strictly any five** questions from **section II**.*
5. *All answers and working must be written in the question paper in the spaces provided below each question.*
6. *Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.*
7. *Non-programmable silent electronic calculators and **KNEC** mathematical tables may be used, except unless 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

Grand Total [ ]

This paper consists of 15 printed pages. Candidates should check the question paper to
Ensure that all the pages are printed as indicated and no questions are missing.

SECTION I (50 marks)

Answer all the questions in this section in the spaces provided

1. Simplify

$$\frac{\frac{4}{5}(3\frac{1}{4} - 1\frac{3}{8}) \div (2\frac{1}{2} \div 5\frac{1}{3})}{\frac{3}{5} \text{ of } 3\frac{1}{5}}$$

(3 marks)

2. A plot in the shape of a rectangle measures 608 m by 264 m. Equidistant fencing posts are placed along its length and breadth as far apart as possible. Find:
   (i) The distance between the posts   (2 marks)

   (ii) The number of posts used   (2 marks)

3. A ship P of 180 km West of a port Q. Another ship R is at a distance of 90 km and on a bearing of 050° from P. A third ship S is due East of R and due north of Q. By scale drawing determine the bearing of S from P. (**Use a scale of 1 cm for 30 km**) (4 marks)

4. Simplify the following by use of common factors: (3 marks)

$$\frac{4ac - 16a^2 - bc + 4ab}{c - 4a} + 4$$

5. A business woman bought 288 bananas at sh 10 for every 12. She sold all of them at sh 20 for every 18. What was her percentage profit? (4 marks)

6. Solve the simultaneous equations (3 marks)

$3x - 2y = 7$
$5x + y = 3$

7. When a piece of cloth was washed, it shrank. Its length decreased from 150 cm to 120 cm.
  (a) In what ratio did it decrease? (1 mark)

(b) Suppose the width decreased in the same ratio. What is the new width if the original width was l.4 m?

(2 marks)

8. Given the following currency exchange rate, calculate to 3 significant figures the number of dollars that can be exchanged for 25 Sterling pounds.

              1 US dollar (\$)   = Ksh 76.85

              1 Sterling pound (£) = Ksh 115.30   (3 marks)

9. A cylindrical tank whose diameter is 1.4 metres and height 80 cm is initially empty. Water whose volume is 492.8 litres is poured into the tank. Determine the fraction of the tank filled with water.

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

(4 marks)

10. A man is now three times as old as his daughter. In twelve years time he will be twice as old as his daughter. Find their present ages. (3 marks)
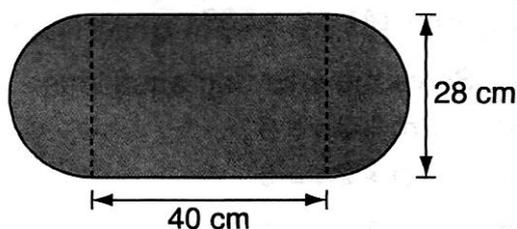
11. The number $5.8\dot{1}$ contains an integral part and a recurring decimal. Convert the number into an improper fraction and hence into a mixed number. (3 marks)

12. An article which is marked for sh 450 is sold to a customer for sh 393.75. What percentage discount is the customer allowed? (3 marks)

13. On a certain map a road 20 km long is represented by a line 4 cm long. Find the area in hectares of a ranch represented by a rectangle measuring 2.8 cm by 1.6 cm on this map. (3 marks)

14. Syengo spends one-third of his salary on food, one-quarter on rent, three-fifths of the remainder on transport and saves the rest. If he spends sh 1 800 on transport, find how much money he saves.
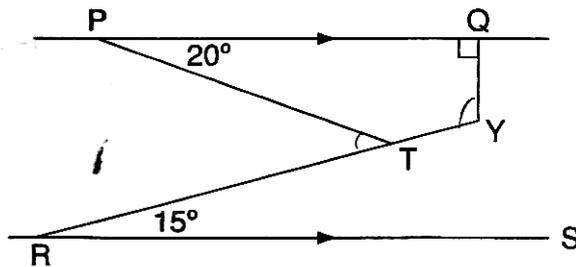(3 marks)

15. The base of an open vessel is as shown in the figure below. The curved ends are semicircular and the height of the vessel is 18 cm.

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Calculate the area of metal sheeting required to construct the vessel, allowing 10% for wastage.

(4 marks)

16. In the figure below PQ is parallel to RS. Angle QPT = 20º, angle TRS = 15°, angle PQY = 90°, RTY is a straight line.

Calculate:

(a) acute angle PTR

(b) Angle QYT

SECTION II (50 marks)

Answer any five questions in this section in the spaces provided.

17. (a) Using a ruler and a pair of compasses only, construct triangle ABC in which BC 6 cm, AB = 8.8 cm and angle ABC 22 ½°. (4 marks)

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(b) Measure AC and angle ACB. (2 marks)

(c) Construct a circle that passes through A, B and C. (3 marks)

(d) What is the radius of this circle? (1 mark)

18. .(a) The angle of elevation of the top of a vertical tower from a point P is 30°. The angle of elevation of the top of the tower from another point Q which is nearer the foot R of the tower is 45°. The distance between P and Q is 20 metres and the points P, Q and R are on the same straight line on level ground.
Using a scale of 1 cm to represent 5 m, draw an accurate scale drawing to represent the above information. (4 marks)

(b) Use your scale drawing to determine
      (i) the height of the tower   (2 marks)

      (ii) the distance QR   (2 marks)

      (iii) the distance PR   (2 marks)

19. . (a) A Jua Kali artisan made an article and sold it to a wholesaler at a profit of 20%. The wholesaler sold the article to a retailer at a profit of 30%. The retailer finally sold the article to a customer at a profit of 50%.
If it cost the artisan sh 500 to make the article, find how much the customer paid for it.   (3 marks)

    (b) A customer paid sh 1 560 for another article. Determine how much the wholesaler had paid for it.
                                                                         (3 marks)

    (c) During a clearance sale the retailer reduced his prices by 10%. Find the percentage profit the retailer made on an article which had cost the artisan sh 1 000 to make   (4 marks)

20. . (a) A newly built classroom measuring 6.3 m long, 4.5 m wide and 3.2 in high is to be cemented on the floor and all inside walls. The classroom has one door measuring 1.85 m by 80 cm and four windows measuring 1.5 m by 70 cm each. Cementing materials cost sh 500 per square metre while labour costs 20% of the cost of cementing materials. Calculate to one decimal place, the total surface area to be cemented. (5 marks)

(b) the cost of cementing materials. (2 marks)

(c) the total cost of cementing the classroom. (3 marks)

21. A train left Mombasa on Monday evening and travelled to Kisumu according to the travel time table below. The train arrived in Kisumu on Wednesday morning of the same week.

Mombasa	dep.	1930 h
Mtito Andei	arr.	0250 h
	dep.	0335 h
Nairobi	arr.	1050 h
	dep.	1240 h
Nakuru	arr.	1900 h
	dep.	2015 h
Kisumu	arr.	0900 h

(a) Determine the time the train took to travel between

(i) Mombasa and Mtito Andei

(ii) Mtito Andei and Nairobi

(iii) Nairobi and Nakuru

(iv) Nakuru and Kisumu   (4 marks)

(b) Calculate the total time for the whole journey.   (4 marks)

(c) Given that the railway road distance between Mombasa and Kisumu is 1 200 km, calculate the avenge speed for the whole journey.   (2 marks)

22. A rectangular sheet measuring 80 cm by 50 cm is 2 mm thick and is made of metal whose density is 2.5 g/cm^3. A square of side 5 cm is removed from each corner of the rectangle and the remaining part folded to form an open cuboid.

(a) Calculate

(i) the area of metal which forms the cuboid. (2 marks)

(ii) the mass of the empty cuboid in kilograms. (4 marks)

(b) The cuboid is filled with water whose density is I g/cm3. Calculate the mass of the cuboid when full of water. (4 marks)

23. Copy and complete the tables (i) and (ii) below for the functions $y = 7 - 3x$ and $y = 2x - 8$ respectively.
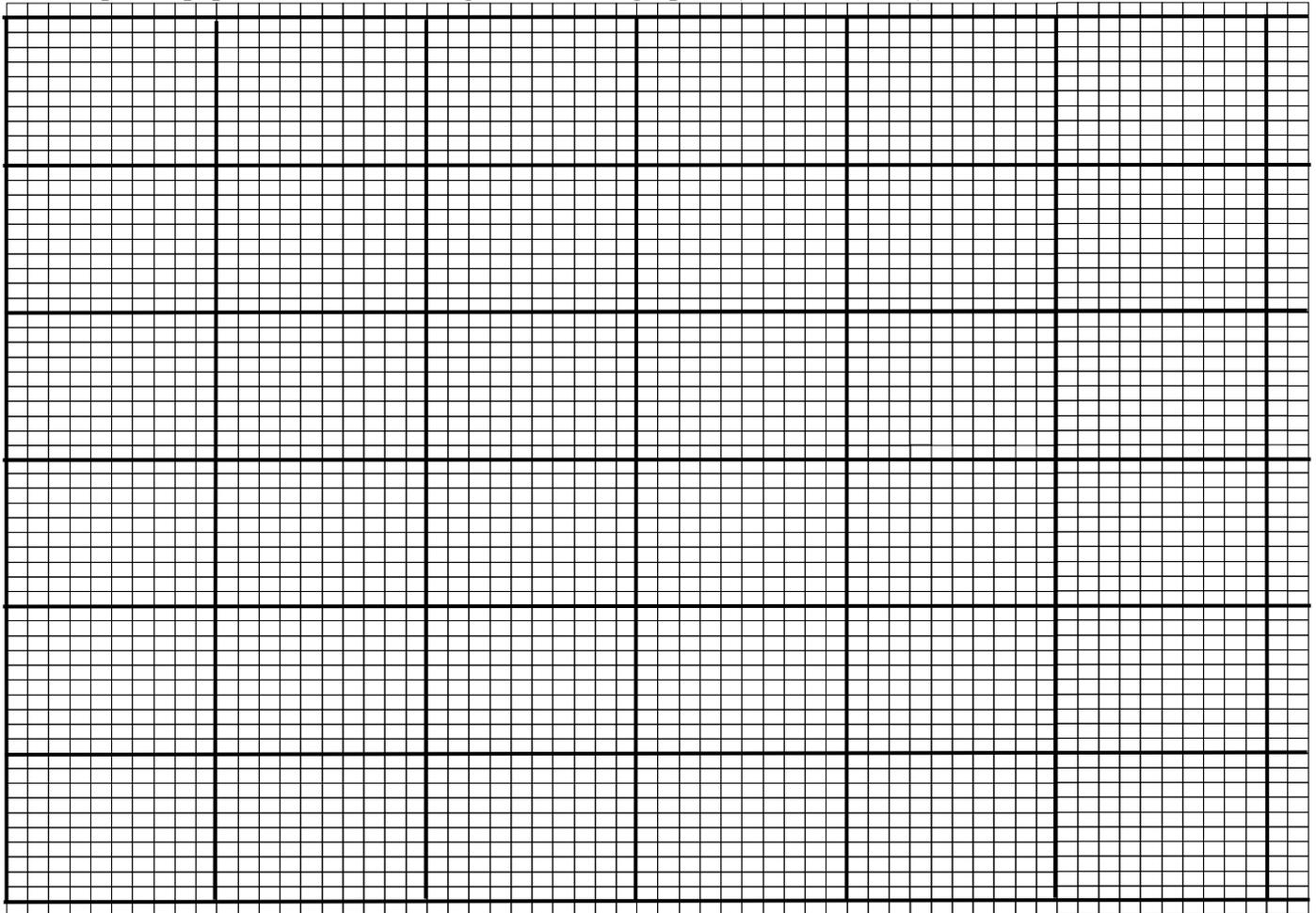
(i)   *y = 7 – 3x*

x	-2	-1	0	1	2	3	4	5

y	13		7					-8

(ii) $y = 2x - 8$

x	-4	-2	0	2	4	6	8	10
y	-16		-8			4		

(b) On squared paper and on the same grid draw the graph of $y = 2x - 8$ and $y = 7 – 3x$ (4 marks)

(c) What is the nature of the two graphs you have drawn?   (1 mark)

(d) Use your graphs to solve the simultaneous equations.   (1 mark)

$3x + y = 7$

$2x – y = 8$

24. The table below represent a surveyor's a field –book record for a piece of land.

	Metres to D	
	250	
	130	90 to C
To E 60	100	
	40	80 to B
	From A	

Calculate the area of the field in hectares. (10 marks)