

NAME: ..... INDEX NO: .....

SCHOOL: ..... DATE : .....

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121/1  
MATHEMATICS  
PAPER 1  
JULY / AUGUST 2013  
TIME: 2½ HOURS

## NANDI NORTH DISTRICT JOINT MOCK EVALUATION TEST 2013

*Kenya Certificate of Secondary Education (KCSE)*  
MATHEMATICS  
PAPER 1  
TIME: 2½ HOURS

### INSTRUCTIONS TO CANDIDATES

- Write your Name and Index Number in the spaces provided at the top of this page.
- Sign and write the date of examination in the spaces provided above.
- This paper contains TWO sections: section I and section II
- Answer all the questions in section I and any FIVE questions from section II.
- All answers and working must be written on the question paper in the spaces provided below each question.
- Show all the steps in your calculations, giving your answers at each stage in the spaces provided below each question.
- Marks may be given for correct working even if the answer is wrong.
- Non-programmable silent electronic calculators and KNEC mathematical tables may be used except where 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	<b>TOTAL</b>

#### **Section II**

17	18	19	20	21	22	23	24	<b>TOTAL</b>

#### **GRAND TOTAL**

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**SECTION 1 (50 MARKS)**

**Answer ALL Questions in this section**

1. Evaluate:

(3mks)

$$\frac{\frac{3}{4} + 1\frac{2}{7} \div \frac{3}{7} \text{ of } 2\frac{1}{3}}{(1\frac{2}{7} - \frac{3}{8})^{\frac{2}{3}}}$$

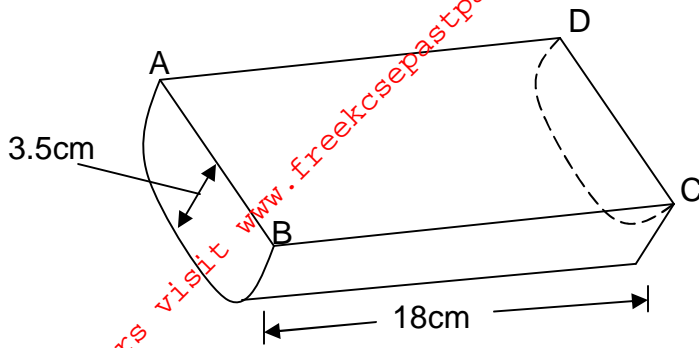
2. A rectangular water tank has a base measuring 4m by 2.5m. This tank has water to a height of 90cm. Water is then pumped into this tank continuously from 2240 hours to 2330 hours at the rate of 1.2 litres per second. Find the new depth of water in the tank after this period of time giving your result in metres. (3mks)

3. The equation of a straight line  $L_1$  is given by  $2y + 8x - 10 = 0$ . Another line  $L_2$  cuts  $L_1$  at right angles such that the point of intersection of the two lines has coordinates  $(-3, k)$ .

(a) Find the value of  $k$ . (1mk)

(b) Hence find the equation of  $L_2$ . (3mks)

4. The figure below is a semi-cylindrical solid of length 18cm and radius 3.5cm as shown.



- (a) Draw the labeled net of the solid.

(2mks)

- (b) Find the surface area of the solid.

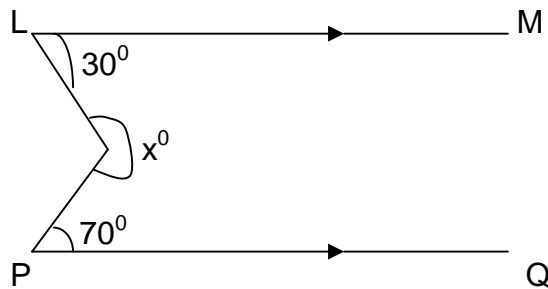
(2mks)

5. If  $\sin \theta = \frac{15}{17}$  and  $\theta$  is acute, find without using calculators or mathematical tables  $\cos \theta + \tan \theta$ .

(3mks)

6. The marked price of a modern camera is Kes 24,000. A trader sold it to a customer at a 10% discount. If the trader still made a profit of 20% on the cost price, what was its cost price? (3mks)

7. On the figure below, Lm is parallel to PQ. Angle MLR =  $30^\circ$  and angle RP =  $70^\circ$ . Find the value of x.



8. The points P(-6, 4) and Q (2,2) are the end points of the diameter of a circle.
- (i) Find the coordinates of the centre of the circle. (1mk)
  - (ii) Hence find the equation of the circle giving your answer in the form  $ax^2 + by^2 + cx + dy + k = 0$  (2mks)

9. Without using logarithm tables, find the value of x in the equation:

(3mks)

$$\log x^3 + \log 5x = 5\log 2 - \log \frac{2}{5}$$

10. Use tables to evaluate:-

$$\frac{5}{(0.293)^2} - \sqrt{(4.125)^3}$$

11. Four strings measuring 12cm, 18cm, 24cm and 36cm are cut into pieces of equal length so that exact number of pieces are obtained from each string without wastage. Find the longest length of each string. (2mks)

12. Dida is now three times as old as his brother and four times as old as his son.

Eight years from now, Dida's age will be twelve years more than the sum of the ages of his brother and his son. Find Dida's present age.

(3mks)

13. A polygon of  $n$  sides has half of the interior angles  $150^\circ$  each and the rest  $170^\circ$  each. Find the value of  $n$ . (2mks)

14. A solid metal cuboid 1.5m long, 0.4m wide and 0.25m high of material of density  $7.5\text{g/cm}^3$ . Calculate its mass in kilograms. (2mks)

15. A Kenyan tourist left Germany for Kenya through Switzerland. While in Switzerland, he bought a watch worth 52 Deutsche marks. Using the exchange rates below:

1 Swiss Franc = 1.28 Deutsche marks.

1 Swiss Franc = 45.21 Kenya shillings.

Find the value of the watch in:

(a) Swiss Francs (2mks)

(b) Kenya shillings (1mk)

16. Using ruler and a pair of compasses only:

(a) Construct triangle ABC in which  $BC = 8\text{cm}$  and angle  $ABC = 105^\circ$  and angle  $BAC = 45^\circ$ . (3mks)

(b) Drop a perpendicular from A to meet line BC at P. Determine the area of triangle ABC. (2mks)

**SECTION II (50 MARKS)**

**Answer any five questions in this section**

17. Five members of 'SILK', a self supporting enterprise Jane, Jepchoge, Esther, Mama Charo and Chepkoech were given a certain amount of money to share amongst themselves. Jane got  $\frac{3}{8}$  of the total amount while Jepchoge got  $\frac{2}{5}$  of the remainder. The remaining amount was shared equally among Esther, Mama Charo and Chepkoech each of which received Kshs. 6,000;

- (a) How much was shared among the five business women? (3mks)
- (b) How much did Jepchoge get? (2mks)
- (c) Jane, Jepchoge and Chepkoech invested their money and earned a profit of Kshs. 12,000. A third of the profit was left to maintain the business and the rest was shared according to their investments. Find how much each got. (5mks)

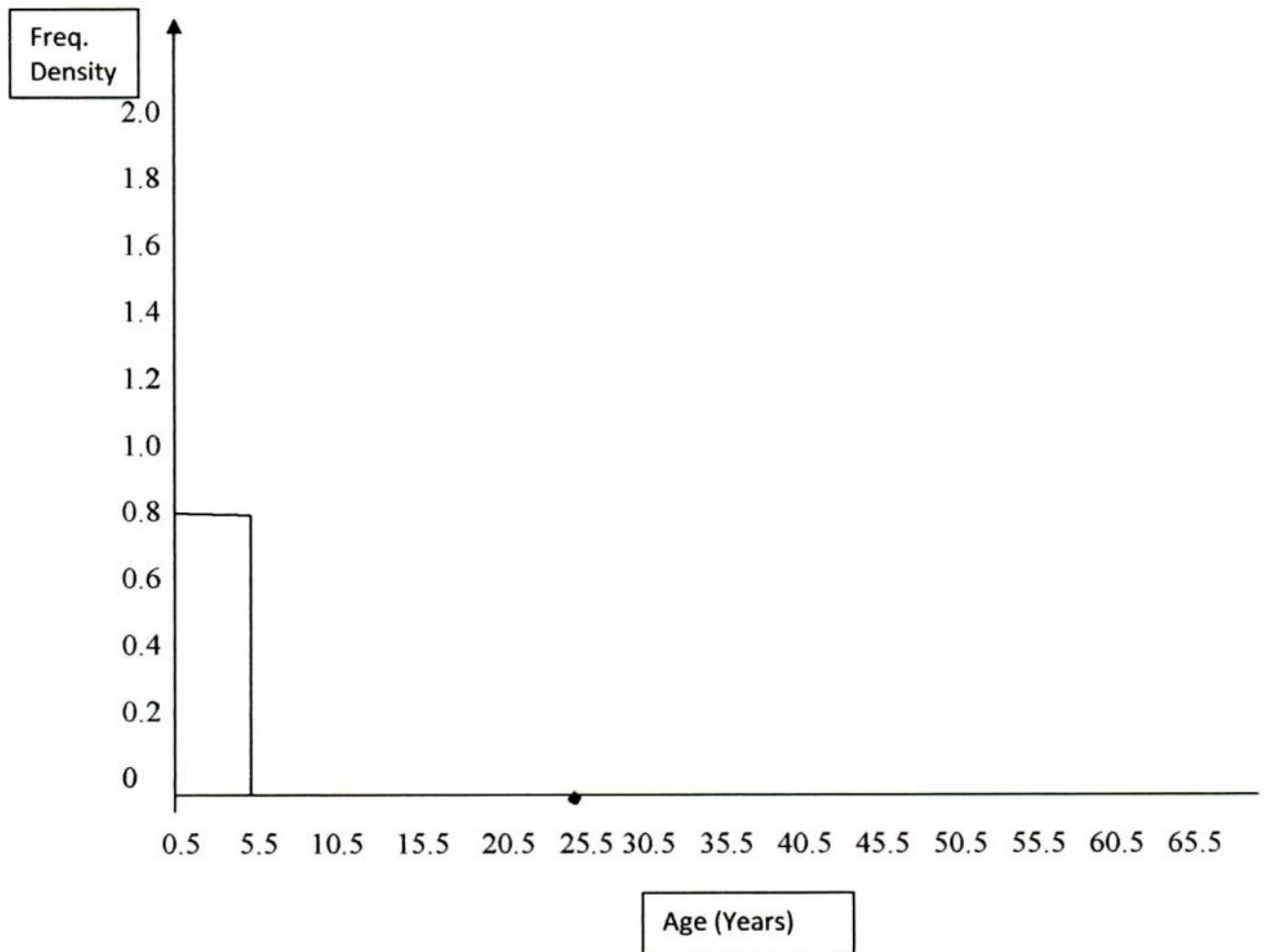


18. The following data shows the sample of age distribution of the people who reside in a certain village in years, in Nandi County.

Age group	Frequency
1.....5	4
6.....10	8
11 .....20	8
21 ..... 30	6
31 ..... 50	40
51.....55	3
56 ..... 65	3

Complete the histogram of the given data below.

(6mks)



(b) Calculate the mean age of the given sample in the village.

(4mks)

- 19.(a) (i) Complete the table below the quadratic graph  $y = 2x^2 - 4x - 9$  in the range,  $-4 \leq x \leq 5$ .

x	-4	-3	-2	-1	0	1	2	3	4	5
y		21					-9			

- (ii) On the grid provided, draw the graph of  $y = 2x^2 - 4x - 9$  for values of x from  $-4$  to  $+5$  (3mks)

- (b) Use your graph to solve the following quadratic equations:-

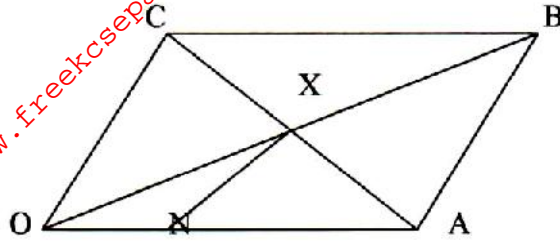
(i)  $2x^2 - 4x - 9 = 0$  (1mk)

(ii)  $2x^2 - 6x - 12 = 0$  (2mks)

- (a) Without using the graph, determine the coordinates of the turning points on the graph. (2mks)

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20. In the diagram below, OABC is a parallelogram where  $\vec{OA} = a$  and  $\vec{AB} = b$ . N is a point on line OA such that  $ON:NA = 1:2$ .



(a) In terms of  $a$  and  $b$ , find:-

(i)  $\vec{AC}$

(1mk)

(ii)  $\vec{BN}$

(2mks)

(b) Line AC and BN intersect at point X such that  $AX = hAC$  and  $BX = kBN$ .

(i) By expressing  $\vec{OX}$  in two different ways, find the values of  $h$  and  $k$ . (6mks)

(ii) Express  $\vec{OX}$  in terms of vectors  $a$  and  $b$ .

(1mk)

21. A ship B is on bearing of  $080^{\circ}$  from port A and at a distance of 95km. another ship is stationed at port D which is on a bearing of  $200^{\circ}$  from A and a distance of 124km from B. A ship leaves B and moves directly to island P which is on a bearing of  $140^{\circ}$  from A.

(a) Using a scale of 1cm to represent 10km, make a scale drawing to show the relative positions of A, B, D and P. (4mks)

(b) Hence find:-

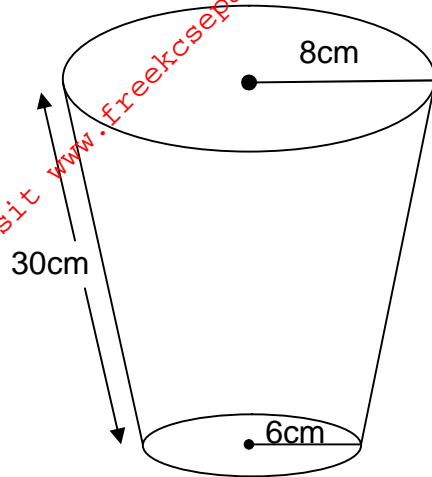
(i) The distance from A to D. (2mks)

(ii) The bearing of D from B. (1mk)

(iii) The bearing of P from D. (1mk)

(iv) The distance from P to D. (2mks)

22. A pail is in the shape of a container frustum with base radius 6cm and top radius 8cm. The slant height of the pail is 30cm as shown below. The pail is full of water.



(a) Calculate the volume of water.

(6mks)

(b) All the water is poured into a cylindrical container of circular radius 7cm, if the cylinder has the height of 35cm, calculate the surface area of the cylinder which is not in contact with water.

(4mks)

23. Onyango and Juma live 200km apart. One day, Onyango left his house at 7.00am and travelled toward's Juma's house at an average speed of 30km/hr. Juma left his house at 7.30am on the same day and travelled towards Onyango's at an average speed of 40km/hr.

(a) Determine:-

(i) The time they met. (2mks)

(ii) The distance from Onyango's house where the two met. (2mks)

(iii) How far was Onyango from Juma's house when they met? (2mks)

(b) The two took 15 minutes at the meeting point and then travelled to Juma's house at an average speed of 20km/hr. Find the time he arrived at Juma's house.(2mks)

24. A theatre has a seating capacity of 250 people. The charges are Kshs. 100 for an ordinary seat and Kshs. 160 for a special seat. It costs Kshs. 16,000 to stage a show and the theatre must make a profit. There are never more than 200 ordinary seats and for a show to take place at least 50 ordinary seats must be occupied. The number of special seats is always less than twice the number of ordinary seats. Taking  $x$  to be the number of ordinary seats and  $y$  the number of special seats:-

(a) Write down all the inequalities representing the above information. (3mks)

(b) On the grid provided, draw the graph to show the inequalities. (4mks)

(c) Determine the number of seats each type that should be booked in order to maximize the profit. (2mks)

(d) Determine the maximum profits. (1mk)



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