NAME: ……..INDEX NO:……

SCHOOL: ……SIGNATURE:……

DATE: ……

121/1
Mathematics
Paper 1
2 ½ Hours
JULY/AUGUST- 2016

KAKAMEGA SOUTH SUB-COUNTY JOINT EVALUATION TEST-2016

Kenya Certificate of Secondary Examination (KCSE)

121/1
Mathematics
Paper 1

INSTRUCTIONS TO CANDIDATES

a) Write your name, school and index number in the spaces provided above.
b) Sign and write the date of the 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) Show all the steps in your calculations, giving your answers at each stage in the spaces provided below each question.
f) Marks may be given for correct working even if the answer is wrong.
g) **Non – programmable,** silent electronic calculators and KNEC mathematical tables may be used, except where stated otherwise.
h) Candidates should answer the questions in English

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 to ascertain that all pages are printed as indicated and that no questions are missing.

SECTION 1 (50 MARKS)

Answer all questions in this section in the spaces provided

1. Simplify without using mathematical tables or a calculator (3mks)

   $1\frac{3}{4} - \frac{7}{16}$ of $1\frac{11}{49} \div (\frac{13}{21} + \frac{11}{28})$

2. The diagonal of a square is 15cm.Calculate its perimeter (3mks)

3. (a) The point B(3,2) maps onto B'(7,1)under a translation T_1.Find T_1 (1mk)

   (b) If B^1 is mapped onto B^{11} under translation T_2 given by $\begin{pmatrix} -3 \\ 5 \end{pmatrix}$.Find T_3,given that ;-

   T_3 (B)=B^{11} (2mks)

4. Determine the value of x in the equation below

   Log 5 + log (2x+10)-2=log (x-4) (3mks)

5. The ratio of the exterior angle to interior angle of a regular polygon is 1:9.Determine the number of sides of the polygon (3mks)

6. Find the integral values of x that satisfy the inequalities below (3mks)

   $3x + 1 \leq 4 + 7x < 3x + 11$

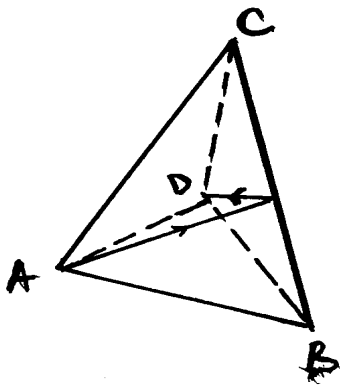
7. An American tourist on holiday in Kenya has US $ 6,000 in traveler's cheque which she changed into Kenya shillings .At the end of her stay in Kenya ,she was left with Ksh.124,934.60.Which she changed into dollars before leaving Kenya.
   (i) What amount of money in Ksh.did she spend in Kenya (2mks)

(ii) How many US dollars did she have before leaving Kenya (1mk)

Use the exchange rate table below

	Buying	Selling
1 US dollar	76.50	76.60

8. The figure shown below is a regular tetrahedron ABCD of edges 4cm,draw its net in the spaces provided, hence, measure the length of the straight path of AD over edge BC. (3mks)

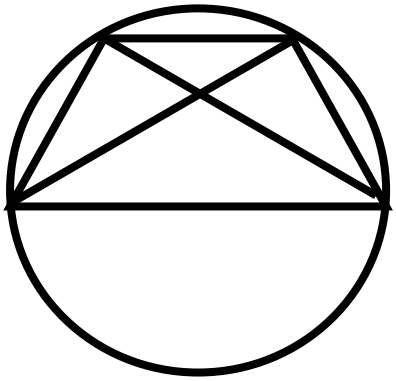


9. Determine the equation of a line perpendicular to the line 3y-2x=4 passing through the point (-2,0) and express your result in the form; (2mks)

$$\frac{x}{a}+\frac{y}{b}=1$$

Hence state the value of a and b (1mk)

10. Given that O is the centre of the circle shown below and angle NMK =34^0,and angle MKL =20^0.Find the value of the following angles.

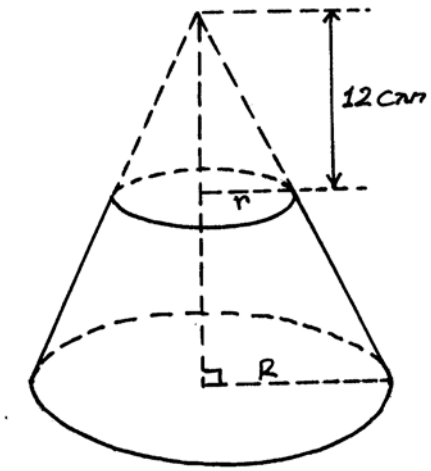


(a) Angle NKM (1mk)

(b) Angle marked J (2mks)

11. Juma drove a distance of 240km from Eldoret to Naivasha at an average speed of X km/hr.Jamlek drove the same distance at 20km/hr faster and took 2 hours less.Find the value of x (3mks)

12. 12cm of a cone is chopped off to form a frustrum as shown below,given that the radius r=8cm and R =14cm



Calculate the height of the frustum (3mks)

13. Three years ago,Juma was three times old as Ali.In two years time, the sum of their ages will be 62.Determine their current ages (3mks)

14.

(i) Express 98 and 72 as product of their prime factors (2mks)

(ii) A rectangle of sides 98cm by 72cm is sub-divided into small squares each of side x(cm).Find the values of X (2mks)

15. Evaluate;- (3mks)

$$\left[\frac{81}{16}\right]^{-3/4} \times \left[\frac{9}{40}\right]^{1/2} \times (27)^{2/3}$$

16. (a) Use mathematical tables of squares and reciprocals to find;- (1mk)

(i) 4.978^2

(ii) $\frac{1}{31.65}$ (1mk)

(b) Hence evaluate to 4 significant figures, the value of (2mks)

$4.978^2 - \frac{1}{31.65}$

SECTION II (50 MARKS)

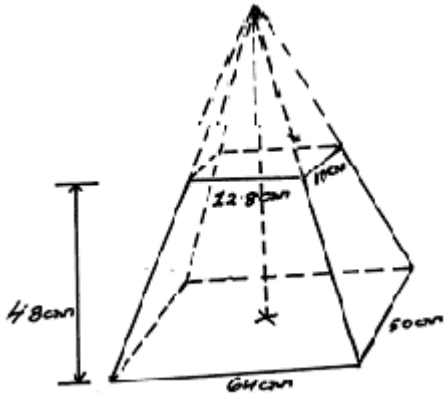
Answer any FIVE questions in this section.

17. The vertices of triangle PQR are P(1,1)Q(4,1)and R(5,4).A transformation represented by matrix T=$\begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}$ maps triangle PQR onto triangle $P^1Q^1R^1$.A second transformation represented by U=$\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$ maps triangle $P^1Q^1R^1$onto triangle $P^{11}Q^{11}R^{11}$

(a) On the same axes ,draw the three triangles PQR,$P^1Q^1R^1$and $P^{11}Q^{11}R^{11}$ (6mks)

(b) Describe a single transformation which maps triangle PQR onto triangle $P^{11}Q^{11}R^{11}$ and find its matrix (4mks)

18. The figure below shows the frustum of a right pyramid with a rectangular ends measuring 64 cm by 50cm and 12.8cm by 10cm respectively. The height of the frustum is 48cm.



(a) Calculate the volume of the frustum (4mks)

(b) Calculate the surface area of the frustum if it is closed at both ends (6mks)

19. Three war ships P,Q and R are at sea such that ship Q is 400km on bearing of 030 from ship P.Ship R is 750km from Q and on a bearing of 120 from Q,an enemy warship S is sighted 1000km due south of ship Q.

(a) Taking a scale of 1cm to represent 100km,locate the position of ships P,Q R and S (4mks)

(b) Using the scale drawing;
Find the compass bearing of

(i) Ship P from ship S
(ii)Ship S from ship R (2mks)

(c) Use the scale drawing to determine
(i) The distance of S from P

(ii) The distance of R from S (2mks)

(d)From the scale drawing:
Find the bearing of
(i) Q from R

(ii) P from R (2mks)

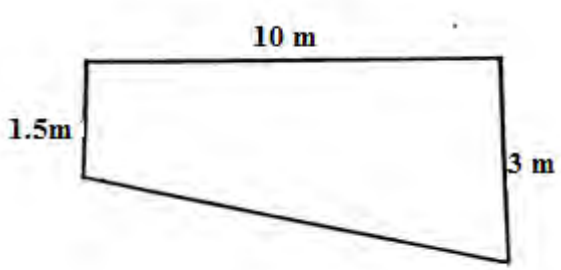
20. Two friends Jane and Tom live 40km apart .One day Jane left her house at 9.00a.m and cycled towards Tom's house at an average speed of 15km/h.Tom left his house at 10.30 am on the same day and cycled towards Jane's at an average speed of 25km/h
(a)Determine
(i) The distance from Jane's house, where the two friends met (4mks)

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

(iii)How far Jane was from Toms house when they met (2mks)

(b)The two friends took 10minutes at the meeting point and then cycled to Toms house at an average speed of 12km/h .Find the time they arrived at Tom's house (2mks)

21. The figure below shows a uniform cross-section of a swimming pool which is 4 meters wide. The depth of the pool increases gently from 1.5 meters to 3 meters.



(a)How much water in litres does it hold when full? (3mks)

(b)Calculate the total internal surface area of the pool (5mks)

(c) Find the angle at which the bottom of the pool inclines to the horizontal (2mks)

22. Complete the table below for the function $y=x^2-4x+5$

X	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8
y	2	1.25	1		2		5		10		17		26		

(1mk)

(c) Using the mid-ordinate rule with seven strips to estimate the area enclosed by the curve $y=x^2-4x+5$,the x axis and the lines x=1 and x=8 (2mks)

(c) Find the exact area of the region in (b) above. Hence calculate the percentage error introduced by using the mid –ordinate rule in (b) above. (5mks)

(d) Estimate the area enclosed by the curve $y=x^2-4x+5$ using the trapezoidal rule with 5 trapezia between x=2 and x=7 (2mks)

23. A group of people agreed to raise Ksh.7200,000 to start a business.They were to share the amount equally.However,20 members were unable to contribute and withdrew from the group.The remaining members had therefore to contribute Ksh.6000 more each in order to raise the greed target.

(a) Write an expression of the amount each member would contribute originally(1mk)

(b) Write an expression of the amount each member would contribute after the withdrawal of some members (1mk)

(c) Calculate the original number of members of the group (6mks)

(d) Calculate the percentage increase in the amount of contribution for each member (2mks)

24. The acceleration of a particle moving from a fixed point 0 after t seconds is a =6 -24t m/s^2.

(a) Calculate the velocity of the particle after 1 second given that initial velocity is 36m/s (3mks)

(b) Calculate the displacement of the particle during the 2^{nd} (2mks)

(c) Calculate the maximum velocity (2mks)

(d) Find the displacement when the particle is momentarily at rest. (2mks)