

Name:.....

Index No:

School:.....

Candidate's Sign:.....

Date:

121/1
MATHEMATICS
PAPER 1
JULY / AUGUST 2011
TIME: 2 ½ HOURS

SOTIK DISTRICT JOINT EVALUATION TEST

Kenya Certificate of Secondary Education (K.C.S.E)

Mathematics
Paper 1

INSTRUCTIONS TO CANDIDATES:-

- Write your **name** and **index number** in the spaces provided above.
- **Sign** and write the **date** in the space provided above.
- This paper contains **two** sections: **Section I and II**.
- Answer **all** the questions in **Section I** and any **five** questions from **Section II**.
- All working and answers **must** be written on the question paper in the spaces provided below each question.
- Show **all** 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

For Examiners' Use Only.

Section I

Questions	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
Marks																	

Section II

Questions	17	18	19	20	21	22	23	24	Total
Marks									

**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 I (50 MARKS)

Answer all the questions in this section in the spaces provided.

1. Evaluate $\frac{28 - (-18)}{-2} - \frac{45 - (-2)(-6)}{3}$ (3mks)

2. Each interior angle of a regular polygon is 100° larger than the exterior angle. Determine the number of sides of the polygon. (3mks)

3. Simplify $\frac{125^{2/5} \div 3^4}{243^{-3/5}}$ (3mks)

4. Find the percentage error in the perimeter of a regular polygon whose side is 15.0cm. (3mks)

5. Kamau bought five exercise books and three geometrical sets for sh.725. If he had bought four similar exercise books and five geometrical sets, he would have paid sh.375 more. How much would he pay for two exercise books and six geometrical sets. (3mks)

6. Find the integral values that satisfy the inequalities

$$4x - 6 \geq x - 12$$

$$8 - 3x \geq 2x - 7$$

Represent it on the number line.

(3mks)

7. Find the least number of biscuits that can be packed into carton boxes which contain either 9 or 15 or 20 or 24 with none left over. (3mks)

8. The second term of a four consecutive odd number is $2n+1$. If the sum of the numbers is 10104, find the value of n . (3mks)

9. The equation of the line L_1 is $2y-5x-8=0$ and the line L_2 passes through the point (3,0) and (5,-5). Without drawing the lines L_1 and L_2 . Show that the two lines are perpendicular to each other. (3mks)

10. Simplify the expression.

$$\frac{x^2 + x - 4xy - 4y}{(x + 1)(4y^2 - xy)}$$

(3mks)

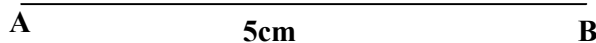
11. Find the position of vector \mathbf{X} , which divides MN externally in the ratio $9:2$. The position vectors of M and N are;

$$\begin{pmatrix} 4 \\ -1 \\ 3 \end{pmatrix} \text{ and } \begin{pmatrix} -10 \\ 1 \\ -4 \end{pmatrix} \text{ respectively.}$$

(3mks)

12. (a) Using the line AB , given below construct the locus of a point P one side such that $\angle APB = 60^\circ$.

(3mks)



(b) On the same diagram locate the position of point C such that point C is on the locus of P and is equidistant from A and B .

(1mk)

13. Determine the quartile deviation for the following set of numbers.

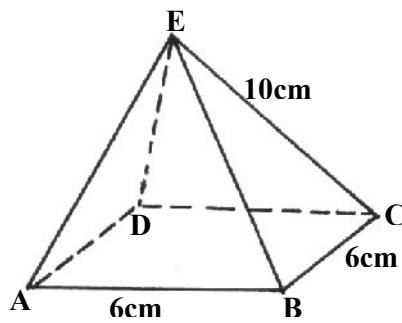
7,5,10,6,5,8,7,3,2,7,8,9

(3mks)

14. Two bags A and B contain similar balls. Bag A contains three red and two black balls. Bag B contains four red and three black balls. A ball is picked from each bag. Find the probability that the balls are of the same colour. (3mks)

15. Solve for x $\log(x+2) = 1 + \log(4x-3)$ (3mks)

16. Draw the net of the solid below and calculate the surface area of solids. (4mks)



SECTION II (50 MARKS)

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

17. The points A (1,1) , B(2,-3) and C(3,0) are vertices of a triangle ABC.

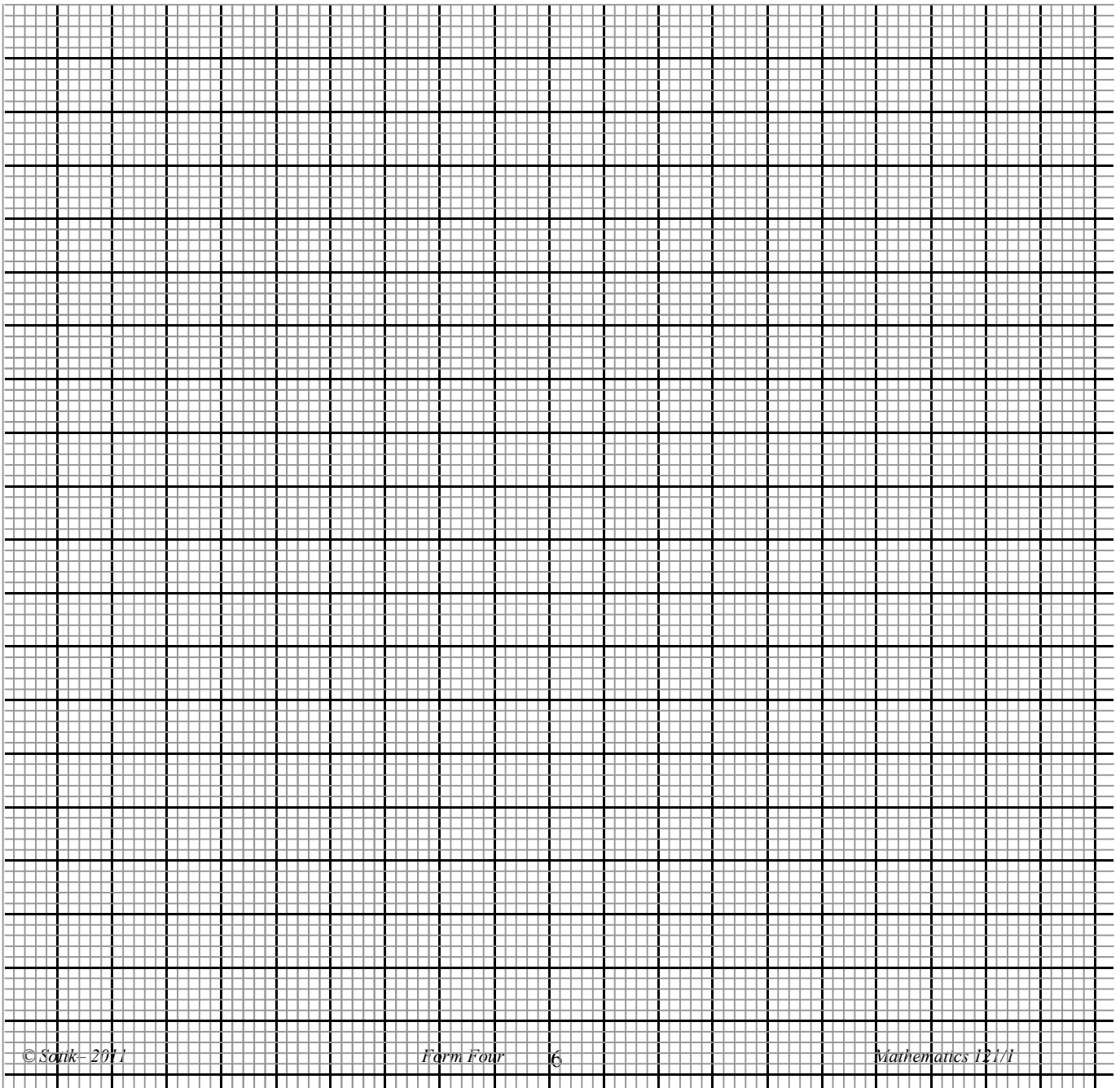
(a) (i) Find the co-ordinates of the vertices of its image $A^1B^1C^1$ under the transformation defined by the matrix

$$S = \begin{pmatrix} 3 & 0 \\ 1 & 1 \end{pmatrix}$$

(2mks)

(ii) Draw the object of the ΔABC and its image $\Delta A^1B^1C^1$ on the grid provided.

(2mks)



(b) The $\Delta A^1B^1C^1$ is then transformed to $\Delta A^{11}B^{11}C^{11}$ by the transformation with matrix R, where

$$R = \begin{pmatrix} 1 & 0 \\ -1 & 3 \end{pmatrix}$$

(i) Write down the co-ordinates of $\Delta A^{11}B^{11}C^{11}$. (2mks)

(ii) Draw the triangle $\Delta A^{11}B^{11}C^{11}$ on the same grid in (a) ii above. (1mk)

(iii) Describe fully transformation which transformation of the $\Delta A^{11}B^{11}C^{11}$ onto ΔABC . (3mks)

18. The table below shows the marks obtained by form four students in a mathematics examination.

Marks	20-25	26-31	32-37	38-43	44-49	50-55	56-61	62-67	68-73
Students	2	6	12	20	26	15	10	7	2

(a) State the modal class.

(1mk)

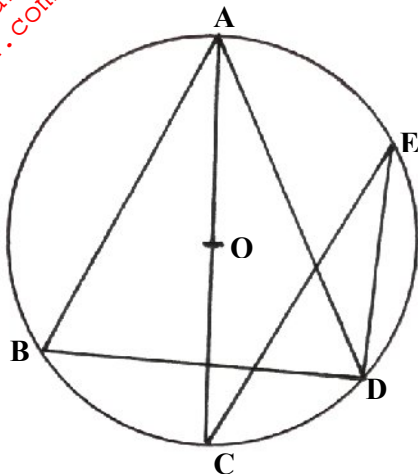
(b)(i) Find the mean.

(5mks)

(ii) Find the standard deviation.

(4mks)

19. In the figure below O is the centre of the circle.



Angle $BAC=40^\circ$, angle $CBD=50^\circ$ and angle $ACD=60^\circ$. Giving reasons determine:

(a) angle CED (2mks)

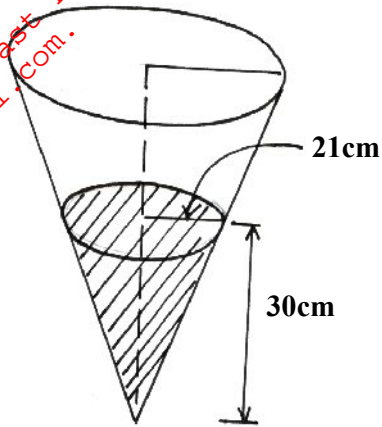
(b) angle BDC (2mks)

(c) angle CAD (2mks)

(d) angle ADB(2mks)

(e) angle ABD (2mks)

20. The figure below shows a cone with water filled as shown.



(a) Calculate the volume of water in the vessel. (2mks)

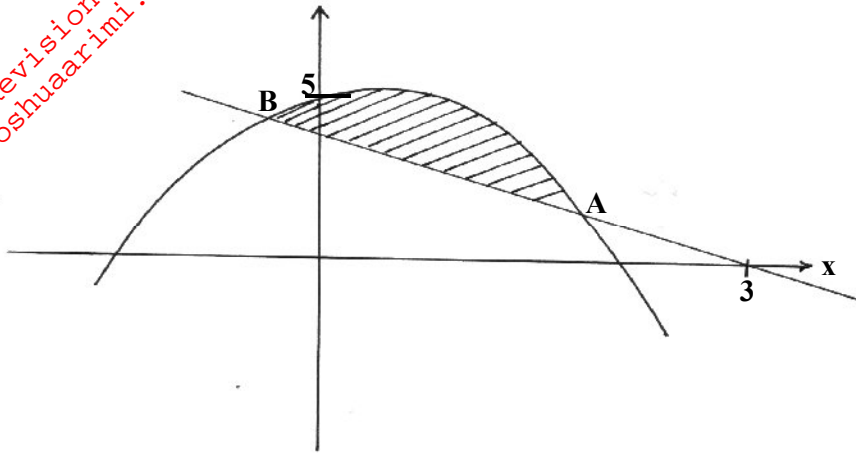
(b) When a metal hemisphere is completely submerged in the water, the water level rose by 6cm.
Calculate:

(i) the radius of the new water surface. (2mks)

(ii) the volume of the metallic hemisphere(4sf). (4mks)

(iii) the diameter of the hemisphere. (2mks)

21. The figure below shows the curve of the function $y=5-x^2$. The line AB passes through the point (3,0) and intersects with the curve at points A and B. If the co-ordinates of A are (2,1).



Find:

(a) The co-ordinates of point B.

(5mks)

(b) The area of the shaded region.

(5mks)

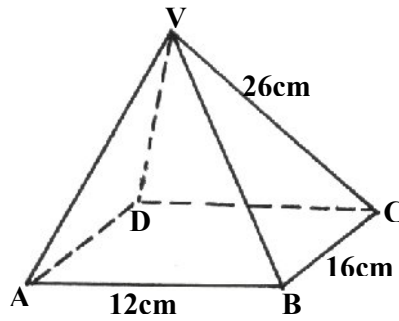
22. Two sides of a triangular plot of land are 30m and 40m. Given that the angle between these two sides is obtuse and its area is 144m^2 . Calculate:

(a) The angle between the two sides. (3mks)

(b) The perimeter of the plot. (4mks)

(c) The radius of the circle which touches all the three vertices of the triangle. (2mks)

23. The right pyramid below has a rectangular base of 12cm. Its slanting lengths are 26cm.



Determine:

(a) The length of AC (2mks)

(b) The height of the pyramid (2mks)

(c) The angle AV makes with the base ABCD. (2mks)

(d) The angle face VAB makes with the base ABCD. (2mks)

(e) The volume of the pyramid. (2mks)

24. In Bomet county; A tailor bought a number of suits at a cost of sh.57,600 from wholesaler. Had he bought the same number of suits from a supermarket, it would have cost him sh.480 less per unit. This would have enabled him to buy four extra suits for the same amount of money.

(a) Find the number of suits the tailor bought. (7mks)

(b) The tailor later sold each suit for sh.720 more than he paid for it. Determine the percentage profits he made. (3mks)