121/1
MATHEMATICS

SECTION I (Answer all questions in this section)

1. Work out without using calculators. (3mks) *Nym *

$$\frac{5^7/_8 - 11^5/_6}{^{11}/_{120} \text{ of } ^3/_{15}}$$

2. Three pieces of barbed wire measuring 3HM, 7DM and 3M were soldered together to give a single piece of wire. What is the length of this piece of wire in metres. (3mks) *Nym *

3. Factorise completely $6x^2 - 8xy + 2y^2$ (3mks) *Nym *

4. Solve the equation $120^{x-3} = 15^{x-3}$ (4mks) *Nym *

5. Use reciprocal tables to work out. (4mks) *Nym *

$$\frac{1000}{0.034} + \frac{20}{981}$$

6. Obtain the Pythagorean triple for 3 and 2 (2mks) *Nym *

7. A regular polygon ha internal angle of 150° and a side of length 10cm.
   (a) How many sides does the polygon have? (1mk) *Nym *
   (b) Find the area of the polygon. (2mks) *Nym *

8. A cylindrical candle of height 6cm and radius 1.25cm melted and it was recast into a cubic block. Find the length of the side of the cube. (3mks). *Nym *

9. Use logarithm tables to work out. (4mks) *Nym *

$$\sqrt[3]{\frac{497 \times 9.84}{5.24 \times 7.65}}$$

10. Express $\frac{x+2y}{20} - \frac{(3x - 2y)}{12} - y-x$ as a single fraction in its simplest form. (3mks) *Nym *

11. A residential estate is to be developed on a 6 hectare piece of land. If 1500 m^3 are to be taken up by roads and the rest to be divided into 40 equal plots. What is the area of each plot in hectares. (4mks) *Nym *

12. Two similar solids have surface areas 48cm^2 and 108 cm^2 respectively. Find the volume of the smaller solid if the bigger one has a volume of 162cm^3. (3mks). *Nym *

13. The line y=mx+6 makes an angle of $75^o 58$ with x-axis. Find the coordinates of the point where the line cuts the x-axis. (3mks) *Nym *

14. In the figure below ABC is a straight line, BD = BC, angle AED = 3x and angle BDC = ¼ $(192^o + x^o)$. Find the value of x.. (3mks) *Nym *
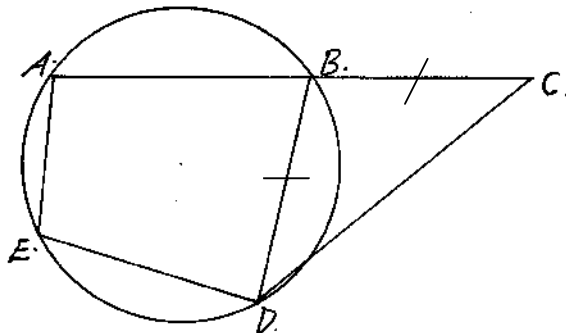
15. Phena bought a crate of tomatoes for sh. 345 which she sold and made a profit. If she had sold the crate of tomatoes for sh. 320, she could have made a loss a third of the profit. What was the selling price for the crate of tomatoes? (3mks). *Nym *

16. A triangle flower garden has an area of 28m². Two of its edges are 14 metres and 8 metres. Find the angle between the two edges. (2mks) *Nym *

SECTION II

17. Use elimination method to solve the pair of simultaneous equations. (3mks) *Nym *

   (a) $\dfrac{d}{4} - \dfrac{n}{3} = 6$ and $\dfrac{3d}{2} + \dfrac{5n}{6} = 2$

   (b) Solve graphically the simultaneous equations.

   $2x = y-1$ and $x = 2y+4$. (7mks) *Nym *

18. Atambo poured spirit into a test tube which has hemisphered bottom of inner radius 1.5 cm. He noted that the spirit is 8cm high.

   (a) What is the area of surface in contact with spirit. (4mks) *Nym *.

   (b) Calculate volume of spirit in the test tube. (4mks) *Nym *

   (c) If Atembo obtained the mass of the spirit as 10 grammes. Calculate the density of the spirit. (2mks) *Nym *.

19. In the figure below C is a point on AB such that BA = ABC and D is the mid –point of OA. OC and BD intersect at X.
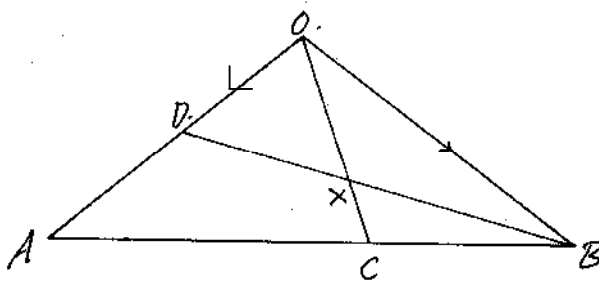
   Given that **OA** = **a** and **OB** = **b**

   (a) Write the vectors below in terms of **a** and **b**.

   (i) **AB** = (1mk) *Nym *

   (ii) **OC** = (2mks) *Nym *

   (iii) **BD** = (1mk) *Nym *

   (b) If **BX** = h **BD**, express **OX** in terms of **a**, **b**, and h. (1mk) *Nym *

   (c) If **OX** = K**OL**, find h and k. (4mks) *Nym *

   (d) Hence express **OX** in terms of **a** and **b** only. (1mk). *Nym *

20. Using a ruler and a pair of compasses only, draw a triangle ABC such that AB = 5cm, BC = 8cm and <ABC = 60°. Measure AC and <CAB. (4mks) *Nym *

   Find a point O in Δ ABC such that OA = OB = OC. (2mks). *Nym *

   Construct a perpendicular from A to BC to meet BC at D. Measure AD. Hence calculate the Δ area of ABC. (4mks) *Nym *

21. The figure below represents the cross section of a metal bar. The cross section is in the form of a major segment of a circle. M is the midpoint AB and CM is perpendicular to AB. Given that AB = CM=8cm, Calculate the volume of the metal bar if it is 15cm long. (10mks). *Nym *
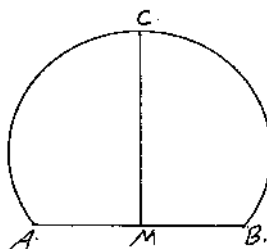
22. The table below shows the amount in shillings of pocket money given to students in a particular school.

Pocket Money Kshs)	210 – 219	220-229	230-239	240-249	250-259	260-269	270-279	280-289	290-299
No. of Students	5	13	23	32	26	20	15	12	4

(a) State the modal class. (1mk) *Nym *

(b) Calculate the mean amount of pocket money given to these students to the nearest shilling. (4mks) *Nym *

(c) Use the same axes to draw a histogram and a frequency polygon on the grid provided. (5mks). *Nym *

23. a) On the grid provided graph the inequalities

$Y \geq O$

$2y \geq 2-x$

$y-x \leq 1$ and

$5y+4x < 20$ (5mks) *Nym *

(b) List all points in the region, which have integral coordinates. (2mks) *Nym *

(c) Calculate the area of this region. (3mks) *Nym *

24. A boy started walking due East from a dormitory 100m South of a bore-hole. He walked to the school library from which the bearing of the bore-hole is 315°. He then walked on a bearing of 030o to the water tank. From the water tank he went west to the bore-hole.

(a) Using a scale of 1cm to represent 20m, construct a diagram to show the positions of the tank, borehole, dormitory and library. (5mks). *Nym *

b) Find the distance and bearing of the bore-hole from the water tank. (3mks) *Nym *

Calculate the total distance covered by the boy. (2mks). *Nym *