

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

121/1
MATHEMATICS
PAPER 1
JULY/AUGUST 2009
TIME:2 ½ HRS

NANDI EAST DISTRICT JOINT EVALUATION TEST 2009

Kenya Certificate of secondary Education
Mathematics
Paper 1
Time 2 ½ hrs

SECTION 1 (50 MARKS)
ANSWER ALL QUESTIONS

1. Express the number 1470 and 7056 each as a product of its prime factors.
Hence evaluate (2 marks)

2. Find the LCM of $(X + 2)$, $(X - 2)$ and hence simplify (3 marks)

$$\frac{3}{X+2} + \frac{X+2}{X-2} - \frac{2X-8}{X^2-4}$$

3. Find the value of y in the equation (2 marks)

$$\left(\frac{1}{64}\right)^y \times \left(\frac{1}{64}\right)^{-1} = 1024$$

4. A girl at the top of a cliff 30 metres high observes two boats S and T out in the sea. The boats and the foot of the cliff are on a straight line, The angle of depression from the girl of S and T are 42° and 27° respectively. Calculate the distance between the two boats (4 marks)

5. Use tables of reciprocals, cube roots and squares to evaluate: (4 marks)

$$\frac{5}{3\sqrt{[(0.0493)^2 + 0.02045]}}$$

6. The edges of a cuboid are measured to the nearest millimeter. If the cross-section is a square of side 9.3cm and the length 28.7 cm. calculate the percentage error in volume. (3 marks)

7. (a) If $\log 2 = X$, Find in terms of X: (3 marks)
 $2 \log 32 + \log \frac{5}{10} + 3 \log \frac{1}{2}$

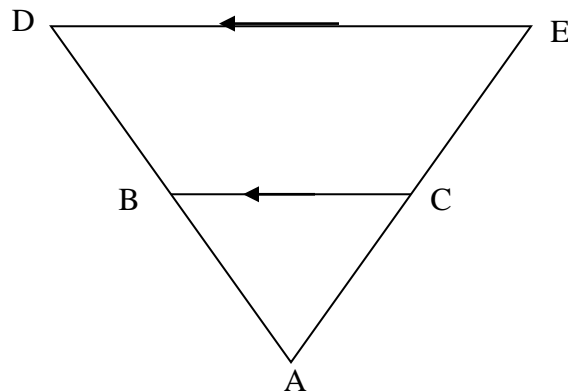
- (b) Simplify the expression (3 marks)

$$\frac{X^2 - 9y^2}{2X^2 - 7Xy + 3y^2} \quad (3 \text{ marks})$$

8. The difference between the interior and exterior angles of a regular polygon at each vertex is 150° . Given that the interior angle is larger than the exterior, find the number of sides of polygon. (3 marks)
9. Solve the simultaneous equation (3 marks)
 $4^x \times 2^y = 1024$
 $\text{Log}(3X - y) = \log 40 - \log 4$
10. A line passing through the points $P(5,K)$ and $Q(2,3)$ is perpendicular to the line $2X - y + 1 = 0$. Determine the value of K (3 marks)
11. A policeman on a road patrol observes a vehicle suspected to be used by gangsters towards Nanyuki, which is 130km away from where he is. By using a radar the policeman observes that the vehicle is traveling at 90km/hr. At what speed must he set his motorbike in order to get the vehicle exactly at Nanyuki, given that the vehicle is 8km away from the policeman (4 marks)
12. Show how the following operation is performed on a number line (2 marks)
 $-5 - (+2)$
13. At a party every two people used a plate of ugali between them. Every three people shared a plate of soup and every four shared a plate of meat. If 65 plates were used in total, how many people were there (3 marks)

14. Given that $\sin \theta = \frac{\sqrt{7}}{3}$ and that θ is an obtuse angle determine $\cos \theta$ without using a mathematical table or calculator. (2 marks)

15. In the figure below the area of triangle $ABC = 100\text{cm}^2$ and that quadrilateral $BCDE = 224\text{cm}^2$. Given that side $BC = 12\text{ cm}$. Calculate the length of side DE . (3 marks)



16. The scale of a map is 1:200,000. The area of a forest on the map is given as 11.7cm^2 . Find the actual area of the forest in hectares (3 marks)

SECTION B: (50 MARKS)
ANSWER ANY FIVE QUESTIONS

17. The distribution table below shows marks obtained in a certain contest

Marks	4-9	10-19	20-59	60-89
-------	-----	-------	-------	-------

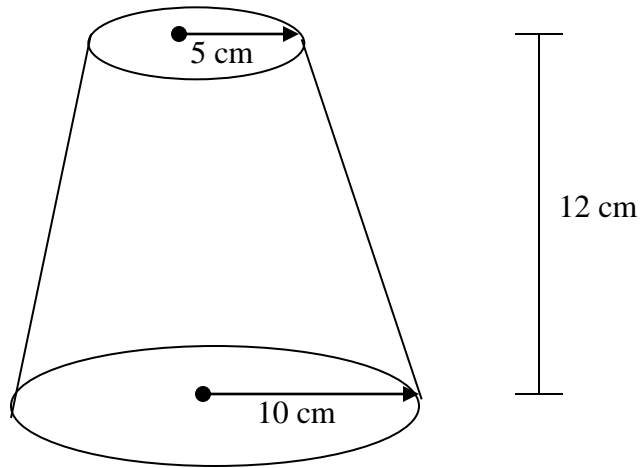
No. of students	14	16	24	6
-----------------	----	----	----	---

(a) Estimate the mean mark (3 marks)

(b) Draw a histogram for the data (on the grid) (5 marks)

(c) Draw on the same diagram the frequency polygon for the distribution (2 marks)

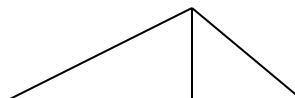
18. The figure below is a frustrum. Given that the top radius is 5cm and the bottom radius is 10cm and the vertical height of the frustrum is 12cm.
(Take $\pi = 3.142$)



- Find (i) The slanting height of the frustrum (2 marks)
(ii) Curved surface area of the frustrum (3 marks)
- (iii) Volume of the frustrum (3 marks)
- (iv) The ratio of the volume of the frustrum to that of the core of which the frustrum is made from (2 marks)

19. A vegetable garden is in the shape (not drawn to scale) shown below

P



B

- (a) Given that 1 cm represented 500m, calculate the area of the garden in hectares
(3 marks)
- (b) Taking PQ as the base line and assuming that the survey is from P to Q. Enter the actual measurements in a Surveyor's field book (3 marks)

20. Copy and complete the table below (2 marks)

$$Y = 5 + 3X - 2X^2$$

X	-2	-1.5	-1	-0.5	0	0.5	1	1.5	2	2.5	3	3.5
y												

- (a) Use the values in the table to draw the graph of $y = 5 + 3X - 2X^2$ (2 marks)

GRAPH

- (b) Use suitable straight lines to graphically solve the equations

- (i) $0 = 2X^2 - 2X - 3$ (3 marks)

(ii) $2X^2 = 2X$ (3 marks)

(c) Identify the line of symmetry (1 mark)

21. Four points, B,C,Q and D lie on the same plane, point B is 42km due south West of Q, point C is 50km on a bearing of 560° E from Q, point D is equidistant from B and C

(a) using a suitable scale, construct a diagram showing the positions of B,C,Q and D (6 marks)

(b) Determine the distance between B and C (1 marks)

(c) (i) By construction divide line AB = 6cm in the ratio AM:MN:NB = 3:4:2 (2 marks)

(ii) Measure NB (1 mark)

22. Triangle PQR has vertices (1,2), (7,2) and (5,4) respectively

(a) Draw triangle PQR on the graph provided (1 mark)

(b) $P^1Q^1R^1$ is the image PQR under a reflection in the line $X = -1$. Draw $P^1Q^1R^1$ and state its co-ordinates (3 marks)

(c) $P^{11}Q^{11}R^{11}$ has vertices (1,5,-1) (4.5, -1) and (3.5, -2) respectively. Draw $P^{11}Q^{11}R^{11}$ and describe the transformation that maps $P^1Q^1R^1$ onto $P^{11}Q^{11}R^{11}$

(3 marks)

(d) $P^{11}Q^{11}R^{11}$ is mapped onto $P^{111}Q^{111}R^{111}$ by a shear $y = -3/2$ invariant such that P^{111} is (3,-1) Draw $P^{111}Q^{111}R^{111}$ and state its co-ordinates

(3 marks)

23. Use a ruler and a pair of compass only in this questions.

(a) Construct a rectangle ABCD such that $AB = 3.2 \text{ cm}$ and diagonal $AC = 4.5 \text{ cm}$

(2 marks)

(b) (i) Draw a line through B parallel to CA

(1 mark)

(ii) Construct a line perpendicular to CA at point B

(1 mark)

(c) (i) Locate a point Y on this line to form a figure AYBC where $\angle CAY = 60^\circ$

(1 mark)

(ii) Measure BY

(1 mark)

(ii) Calculate the area formed by the quadrilateral AYBC

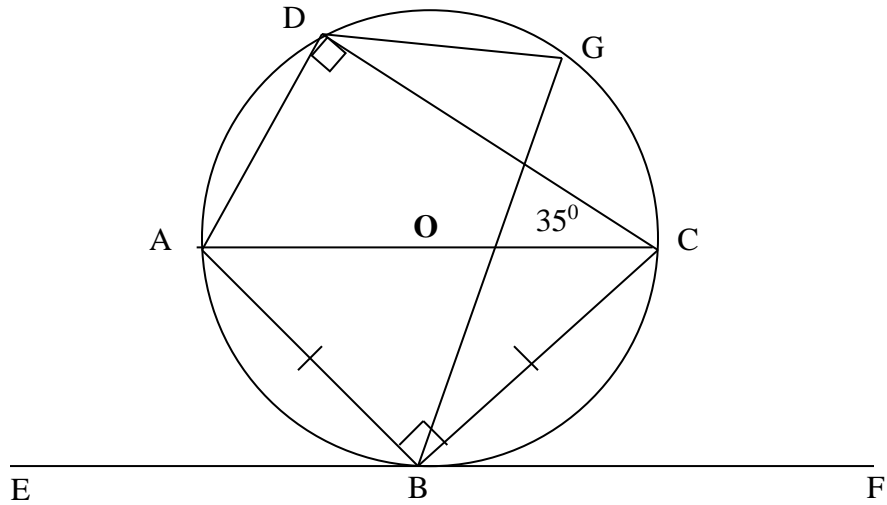
(2 marks)

(d) On the side DC, construct the locus of point P such that angle

$\angle APB = 60^\circ$

(2 marks)

24. In the figure below AOC is a diameter of the circle O . $AB = BC$ and angle $ACD = 35^\circ$. EBF is a tangent to the circle at B . G is a point on the minor arc CD



- (a) Calculate the size of
- (i) Angle BAD (3 marks)
- (ii) The obtuse angle BOD (2 marks)
- (iii) Angle BGD (2 marks)
- (b) Show the angle $ABE = CBF$. Give reasons (3 marks)