

**FORM 3 MATHEMATICS PAPER 1**  
**TERM 1 FORM THREE**  
**121/1**

**INSTRUCTIONS**

- 1: This paper consists of two sections 1 and 2. Answer all the questions in section 1 and any **5** questions in section 2.
- 2: KNEC mathematical tables and electronic non- programmable calculators may be used where necessary.
- 3: Answer all the questions in the spaces provided

Section 1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	total

Section 2	17	18	19	20	21	23	24	total	

Grand total

**SECTION 1**

Answer all questions in this section

1. Find without using tables or a calculator the value of

$$\frac{1.33 \times 0.51}{0.19 \times 0.0017}$$

(3mk)

2. The ratio of the size of the exterior angle to the interior angle of a regular polygon is 1:3. Determine the number of sides of the polygon and name it. (3mk)

3. Given that  $2x^2 - kx + 18$  is a perfect square, find  $k$  and hence solve the equation  $2x^2 - kx + 18 = 0$  by factorization. (4mk)

4. Work out using logarithms to 4 s.f

$$\frac{\sqrt{(6.225 \log 1.001)}}{-(56.7 \times 0.031)^3}$$

(4mk)

5. Mr. Kanja, Miss Kanene and Mrs Nyaga have to mark a form three math contest for 160 students. They take 5mins, 4mins, and 12mins respectively to mark a script. If they all start to mark at 9.00 am non-stop, what is the shortest time they can take to complete the marking?

(3mk)

6. Jackie takes 5minutes to run a distance of 1km in a race. Express her speed in

a) km/hr

b) m/s

(2mk)

7. Use reciprocal tables to find the value of f given that  $\frac{1}{f} = \frac{1}{11} + \frac{2}{13}$

(3mk)

8. A man left  $\frac{1}{5}$  of his estate in Kerugoya to his wife and  $\frac{1}{3}$  to each of his two sons .The remainder was to be shared equally among his six brothers. If the estate was worth sh 3 456 000, how much did each of those people get?

(3mk)

9. A distance of 12km is represented by a length of 4cm on a map. Given that the scale of the map is 1:n, find the

a) value of n

b) actual area in hectares of a field on the map with an area of  $32\text{cm}^2$  (3mk)

10. Solve the equation  $\frac{1}{3}(x+4) - \frac{1}{2}(2x-4) = 2$  (2mk)

11. The sides of a right angled triangle measured to the nearest cm are 5cm, 12cm and 13cm  
Determine the

a) limits within which the measured dimensions lie (1mk)

b) percentage error in the area of the triangle. (3mk)

12. Form a quadratic equation in the form  $ax^2+bx+c=0$  whose roots are b and twice the negative reciprocal of b.  
(3mk)

13. The coordinates of points A and B are A (2, 3). B (4, -5). M is the midpoint of vector AB.  
Determine the coordinates of point M and the magnitude of vector BM. (3mk)

14. The equation of line L is  $y=3x-4$  and is perpendicular to line H. They cross each other at the y-intercept of line L. Find the equation of line H. (3mk)

15. In a circle radius 10cm, an arc PQ subtends an angle of  $\frac{5}{12}\pi$  radians at the centre of the circle. Calculate the radius of another circle whose circumference is equal to the length of arc PQ  
(4mk)

16. Solve for a in  $3^{2a+3} = 2187$  (3mk)

## SECTION 2

Answer any 5 questions in this section

17. Four towns are situated in such a way that town Q is 500km on a bearing of  $120^\circ$  from P. Town R is 240km on a bearing of  $210^\circ$  from town P, while town S is due north of town Q and due east of town P.

a) Draw a sketch diagram showing the relative positions of P, Q, R and S. (2mk)

b) Find by calculation

i) the distance QR (2mk)

ii) the distance QS (2mk)

iii) the angle PRQ (2mk)

iv) area of triangle PQS (2mk)

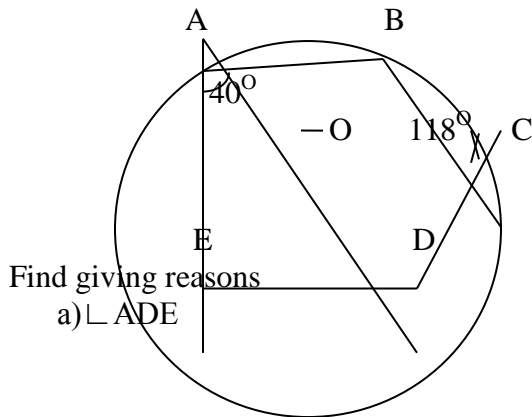
18. a) Represent the following inequalities graphically by shading the unwanted region  
 $x \geq 0, y \geq 0, x+y \geq 5, x+y \leq 10, y \leq 7, x \leq 7$  (6mk)

b) write down the coordinates of one point that is inside the wanted region (1mk)

c) Name the figure formed by the unshaded region (1mk)

d) measure and find the sum of all the angles in the figure formed in c) above. (2mk)

19. In the figure below, O is the centre of the circle and  $\angle EAD=40^\circ$ ,  $\angle BCD=118^\circ$



a)  $\angle ADE$  (2mk)

b) reflex  $\angle EOD$  (2mk)

c)  $\angle EBD$  (2mk)

d)  $\angle EAB$  (2mk)

e)  $\angle DAB$  (2mk)

20. The marks scored in a form three maths exam were recorded as follows

69 70 72 40 52 60 22 31 78 53 28 67 63 54 57 48 47 56 55 62  
 75 38 37 44 62 64 58 39 45 48 65 50 85 46 47 57 35 34 58 64  
 62 37 41 42 36 54 82 48 53 57 56 72 56 48 44 55 78 59 50 45

a) Make a grouped frequency table with classes 20—29,30—39,40—49,etc (2mk)

b) What is the modal distribution of the test (1mk)

c) Calculate the mean of the data (4mk)

d) Calculate the median mark (3mk)

21. The velocity( $v$ )of a vehicle measured at intervals of time( $t$ ) were recorded as follows

t(s)	0	2	4	6	8	10	12
v(m/s)	0	20	40	40	30	8	0

a) Represent this motion on a graph (3mk)

b) Calculate the acceleration (2mk)

c) Calculate the total distance travelled by the vehicle (3mk)

d) Calculate the average velocity of the vehicle (2mk)

22. A wooden stool is in the form of a frustum of a cone with slant edge 40cm, top diameter 30cm and bottom diameter 50cm.

a) calculate the perpendicular height of the stool (3mk)

b) calculate the total surface area of the stool in terms of  $\pi$  (3mk)

c) calculate the volume of wood used to make the stool in terms of  $\pi$  (3mk)

d) given that the density of the wood used to make the stool is  $0.8\text{g/cm}^3$ , calculate the mass of the stool in kg (1mk)

23. Using ruler and compasses only,

a) construct triangle ABC in which  $AB=5\text{cm}$ ,  $BC=6\text{cm}$  and angle  $ABC=120^\circ$ . (3mk)

b) measure angle ACB (1mk)

c) drop a perpendicular from C to cut AB produced at P. Measure CP. (2mk)

d) hence calculate area of triangle ABC to 1dp (2mk)

e) calculate the radius of a circle that passes through the vertices of triangle ABC (2mk)

24. The distance between two towns A and B is 360km. A minibus left town A at 8.15a.m and travelled towards B at an average speed of 90km/hr. A matatu left town B at 10.35a.m on the same day and travelled towards A at an average speed of 110km/hr.

a) i) how far from A did they meet? (4mk)

ii) at what time did the two vehicles meet? (2mk)

b) A motorist left his home at 10.30a.m on the same day and travelled at an average speed of 100km/hr. He arrived at B at the same time as minibus. Calculate the distance from B to his home.

(4mk)