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121/1 MATHEMATICS Paper 1 July/August 2 ½ Hours 10

# **MASINGA DISTRICT JOINT EVALUATION TEST- 2011**

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

121/1 MATHEMATICS Paper 1 July/August 2 ½ Hours

# **INSTRUCTIONS TO CANDIDATES**

- (a) Write your name and index number in the spaces provided above.
- (b) Write the date of 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) All answers and working must be written on the question paper in the spaces provided below each question.
- (f) Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
- (g) Marks may be given for correct working even if the answer is wrong.
- (h) Non- programmable silent calculators and KNEC mathematical tables may be used except where stated otherwise.
- (i) This paper consists 16 printed papers.
- (j) Candidates should check the question paper to ascertain that all the papers are printed as indicated and that no questions are missing.

### FOR EXAMINER'S USE ONLY SECTION 1

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

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TOTAL	

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# **Turn Over**

121/1 mathematics paper 1

# SECTION I (50 MARKS) Answer all questions in this section

Without using mathematical tables or calculators, evaluate

(3 Marks)

- or wore preelimm. Joshiaarini. Cont
  - 2. Three business people, Mutua, Kamau and Mwiti contributed a total of ksh.164,500 to start a retail business. The ratio of contribution of Mutua to Kamau was 2 : 3, that of Kamau to Mwiti was 4 : 5. How much did Mutua contribute? (3 Marks)

Munyao bought 24 trays of eggs at sh225 each. Each tray contains 30 eggs but when transporting, 54 eggs broke. At what price must he sell each egg in order to realise a profit of 22%. Give your answer correct to the nearest shilling. (3 Marks)

itself passing through (4, <sup>2</sup>2). (3 Marks)

4. A line L<sub>1</sub>, passes through (2, -3) and (-5, 1). Find the equation of another line L<sub>2</sub> parallel to L<sub>1</sub> and

ATISWETS

5. Solve the following simultaneous inequalities and state the integral values for the solution.

_	—> 1	(3 Marks)
3	+1 < -17	

6. Solve the equation.

16 8 = -

(3 Marks)

121/1 mathematics paper 1

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ATISWETS 7. Given the matrix below is a singular matrix. Find the values of t. 8 - 2 = 08 3 -8

(3 Marks)

ROY NOT THE PROFILE INNON . JOSHUBALINI. CON. 8. A security guard observes that the angle of elevation to the top of an observation tower is  $26^{\circ}$ . If he walks 55m towards the base of the tower, the angle becomes 47.5°. What is the height of the tower? (4 Marks)

9. If H = -+ -+, Find b when a = 2, c = 4 and H = 6.

(3 Marks)

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121/1 mathematics paper 1 (3 Marks)



- .---- and Anone 1÷5 11. Four farmers took their cows to the market. Kilonzo had two more cows than Mutua. Kyengo had three times as many cows as Kilonzo whereas Mwondu had ten less cows than both Kilonzo and Kyengo
  - a) Write a simplified algebraic expression with one variable representing the total number of cows.

(1 Mark)

b) Three butchers bought all the cows and shared them equally. If each butcher got 17 cows, find the number of cows Mutua had. (2 Marks)

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13. Without using mathematical tables or a calculator, evaluate. Leaving your answer in surd form,

(3 Marks)

- 14. A map is drawn to a scale of 1 : 50,000 find;
  - i) The distance in km between two places which are 25cm apart on the map. (1 Mark)

ii) The area in  $cm^2$  of a field if the actual area of the field is  $120,000m^2$ . (2 Marks)

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- 15. Draw a line AB = 7.3cm. Using a ruler and a pair of compasses only, locate a point D such that AD : DB = 1 : 2. (3 Marks)
  - 16. The figure below represents a scale diagram (not drawn to scale) of a coffee plantation.Given that the scale used is 1cm to 50m. Calculate its area in hectares. AB = 7cm. (4 Marks)



# Answer only five questions from this section

17. a) A carpet measuring (x + 4)m by (x + 1)m is laid down in a rectangular room measuring 2x m by x m leaving out uncovered floor near the walls all round the room. If the carpet is 36m<sup>2</sup>, calculate the area of the uncarpeted floor. (6 Marks)

b) If 20cm square tiles were used to carpet the uncarpeted section of the floor in (a) above, calculate the cost of carpeting the whole floor if the carpet costs sh300 per metre square and each tile costs sh100. (4 Marks)



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(2 Marks)

x solve  $p_{ab}$   $p_{$ c) Find a cubic equation whose solutions are x = 3, x = 4 when the graph of  $y = x^3 - 4x^2$  is used to (2 Marks)

- 19. Given that the position vector of A, B and C are 3i 2j, -6i + 4j and -9i 3j respectively. a) State the column vectors,
  - i) AB (2 Marks)

CB (2 Marks) ii)

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Þŗ Papers are through B papers are of through B papers are of the midpoint of AC b) Find the distance from A to C through B

121/1 mathematics paper 1 (2 Marks)

(2 Marks)

d) If point  $C^1$  is the image of C under translation vector , find the co-ordinates of  $C^1$ . (2 Marks)

20. A cylindrical water tank can be filled to a depth of 2.8m by a pipe A in 2 hours. Pipe B takes 8 hours to fill the tank to the same depth. Pipe C can empty this amount in 6 hours.

a) Starting with tank empty and pipe A running alone in one hour, find the depth of water it fills. (2 Marks)

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b) If pipe A is turned offcand pipe C left open for one hour, what will be the new depth of water? (3 Marks)

Free Market bow long will the depth of water reach 2m? (5 Marks)

- 21. The bearing of towns P and Q on a horizontal ground from a tower are 050° and 142° respectively. The angle of elevation of the top of the tower from town P is 34°. Given that P is 200m from the top of the tower and Q is120m from the base of the tower. Determine,
  - a) The height of the tower.

(3 Marks)

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b) The angle of elevation of the top of the tower from Q.

PT

121/1 mathematics paper 1 (2 Marks)

Revie Revie active to the distance between the two towns P and Q.

(4 Marks)

22. A cone is made by cutting off a sector as shown below from a circle and gluing the straight edges of the sector. The cone formed has a slant height 14cm and circular base of perimeter 11cm.

(Take



a) Determine the value of  $\theta$ 

(2 Marks)

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b) The radius of the cone we tircular base b) The radius of the cone we tircular base page to page

121/1 mathematics paper 1 (2 Marks)

(3 Marks)

d) The cone is cut uniformly on a horizontal plane 1cm below the apex. Calculate the slant height of the frustum so formed correct to 2d.ps.(3 Marks)

23. In the figure below RY is the diameter with O as the centre. If  $\langle PRZ = 108^{\circ}, \langle RPZ = 24^{\circ}, \langle PQZ = 8^{\circ} \rangle$  and PQ is a tangent to the circle. ZNQ is a straight line.



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e) <ZYN

(2 Marks)

- 24. Use ruler and compasses for all construction in this question
  - a) Construct a quadrilateral PQRS such that the base PQ = 5cm, PS = 5cm and SR = 4.5cm. Angle  $SPQ = 75^{\circ}$  and argin  $PSR = 90^{\circ}$  (4 Marks)
  - b) Drop a perpendicular from point S to meet line PQ at N. measure SN. (2 Marks)
- c) Construct a circle passing through vertices P, Q and R of the quadrilateral PQRS. Measure the radius of the circle. (2 Marks)

d) Determine the area of the quadrilateral PQRS.

(2 Marks)

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