

Name: ..... Index no .....

School: ..... Candidate's sign .....

Date: .....

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

# NDHIWA DISTRICT JOINT EVALUATION TEST

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

**Mathematics  
Paper 2**

**INSTRUCTIONS TO CANDIDATES:**

- Write your **name**, **index number**, **Signature** and write date of examination in the spaces provided
- The paper contains **two** sections. Section **I** and Section **II**.
- Answer **all** the questions in section I and any **five** questions in section **II**.
- Answers and working **must** be written on the question paper 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 table may be used, except where stated otherwise.

**FOR EXAMINERS USE ONLY**

**SECTION I**

<b>Question</b>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	<b>TOTAL</b>
<b>Marks</b>																	

**SECTION II**

<b>Question</b>	17	18	19	20	21	22	23	24	<b>TOTAL</b>
<b>Marks</b>									

**TOTAL MARKS**

*This paper consists of 12 printed pages. Candidates should check to ascertain that all papers are printed as indicated and that no questions are missing.*

## SECTION I

*Answer only five questions from this section.*

1. Solve using squares, square roots and reciprocal table giving our answer to 4 decimal places. (3mks)

$$\sqrt{\frac{3}{0.3421}} - \frac{1}{1.025} + (0.02425)^2$$

2. A chord AB of length 13cm subtends an angle of 67° at the circumference of a circle. Find the radius of this circle to 4 significant figures. (3mks)

3. Make x the subject of the formula:

$$P = KQ^x - R$$

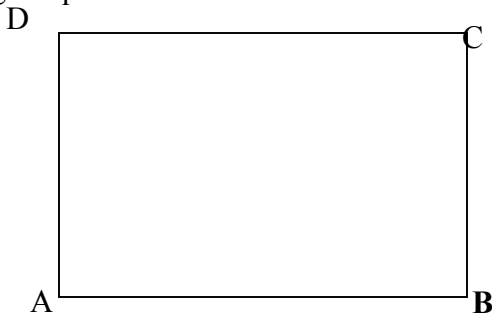
(3mks)

4. A salesman gets a commission of 2% on sales up to sh 100,000. He gets additional commission of 1.5% on sales above this. If he sells goods worth sh. 360,000 and allows a discount of 2%, calculate the amount of commission he received. (3mks)

5. A solid metal cylinder with radius 7cm and height 5 cm is melted down and recast into a spherical ball. Calculate to 1 decimal place the surface area of this ball. (3mks)

6. Coffee of grade A costing Ksh. 60 per kg is mixed with Coffee of grade C costing ksh 40 per kg in the ration 1:3. In what ratio should this mixture be mixed with coffee of grade B costing ksh. 50 per kg so as to produce a mixture worth ksh. 47 per kg. (3mks)

7. In the rectangle ABCD below, clearly shade the region within the rectangle defined by locus P which satisfy the following inequalities.



- i)  $APC = 4 \text{ cm}$
- ii)  $PD \leq PA$
- iii)  $\text{Angle PAD} < \text{Angle PAB}$

8. Find the shortest distance between two towns  
A (55 N, 80 E) and B (55 S, 80 W) Take radius of the earth to be 6370 km. (3mks)

9. In the figure below DA is diameter of a circle ABCD, center O. TCS is the tangent to the circle at C. BA= BC, Find the size of angle BCS (2mks)

10. A body start from rest and accelerate to a velocity of 10m/s. it continues with this speed for 15 seconds and then decelerates to rest. The whole journey covered is 800m. find the total time taken for the whole journey. ( 3mks)

11. The relationship between A and n is thought to be of the form  $A+ BC$ . The two variable are graphically presented below, from some experimental data. Use the graph to obtain the values of B and C. (3mks)

12. The figure below represents a trapezium with AB parallel to DC, and AB = 5cm, BC= 7 cm DC= 10 cm and AD = 5 cm.  
Calculate the size of angle ADC 3mks

13. Find the area of triangle PQR such that the area of its image is 12 cm after a transformation given by the matrix  $\begin{pmatrix} 2 & 1 \\ 4 & 4 \end{pmatrix}$  (3mks)

14. In Physics lesson, a student measured the diameter of two objects and recorded them as  $a=20.6$  and  $b=15.2$  cm.  
Find the percentage error in working out  $a+b$  correct to 4.d.p. (3mks)

15. Find the quartile deviation for the following set of data.  
16, 42, 41, 6, 20, 28, 19, 23, 15 (3mks)

16. A bag contains 4 red balls and  $X$  green balls.  
The probability of picking a red ball is 0.2. Find the total number of balls in the bag. (2mks.)

**SECTION II 50 MARKS**

*Answer any Five questions from this section.*

17. The coordinates of points P and T are (1,-2 ) and (3,6) respectively. A point Q divides line PT in the ratio 3: -1.

(a) Determine the coordinates of point Q. (2mks)

b) Find the gradient of the line perpendicular to PQ ( 1mk)

c) Hence determine the equation of the line perpendicular to PQ and passing through T, in the form  $Y=mx+c$  ( 2mks)

(d) if the Perpendicular line meets y – axis at R. Calculate the distance TR to three significant figures (3mks )

(e) Point N is on OQ such that  $NQ = 3ON$ . Determine the equation to the line parallel to PQ but passing through point N. (2mks)

18. Water flows through a cylindrical pipe of radius 10m at a rate of 2.1 m per second.

a) Calculate the volume of water delivered by the same pipe in 1 minute in liters.

(3mks)

b) A cylindrical storage tank of height 3m is filled with water from this pipe at the same rate of flow. Water starts flowing into the empty tank at 0630 hours and is full at 1310 hours..

calculate the radius of the storage tank in litres.

( 5mks)

c) Four families consume the capacity of this tank in one month. The water costs sh. 4.50 per thousand litres, plus a fixed charge of sh. 222 if they share the bill equally, calculate the amount paid by each family.

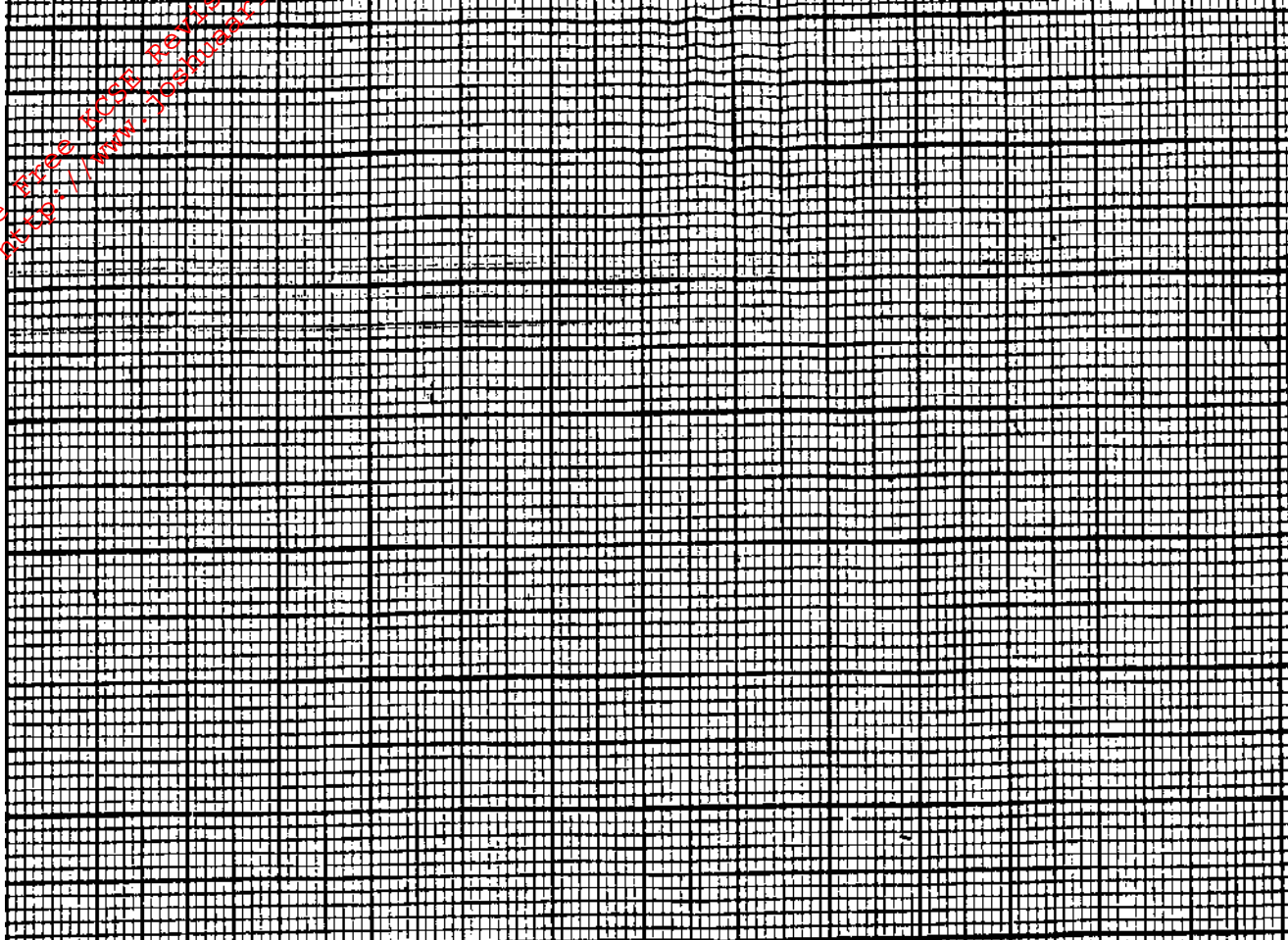
(2mks)

19. The table below shows the marks scored by students in a maths test.

Marks	10-9	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99
No. of students	3	5	6	21	12	6	4	2	1

a) From the above table determine the 20<sup>th</sup> percentile.

(2mks)



b) Use the above table to draw the cumulative frequency curve (O give curve).

(4mks)

i) Using the above graph draw in (b)

Determine the pass mark if 40% of the student passed.

(2mks)

ii) If the pass mark was pegged at 65%. How many students passed.

(2mks)



20. A triangle A (-5,-2) B(-2,-5) and C (-5,-5)  
Undergoes a reflection transformation through the line  $Y = -x$ .

a) Obtain the coordinates of its image ABC after the above transformation hence show them on the Cartesian plane. (2mks.)

b) A B and C in the image of A B and C after another transformation of  $+ 90$  turn about the origin.

c) Find the coordinates of A, B and C hence show them on the Cartesian plane on the same axes. (4mks)

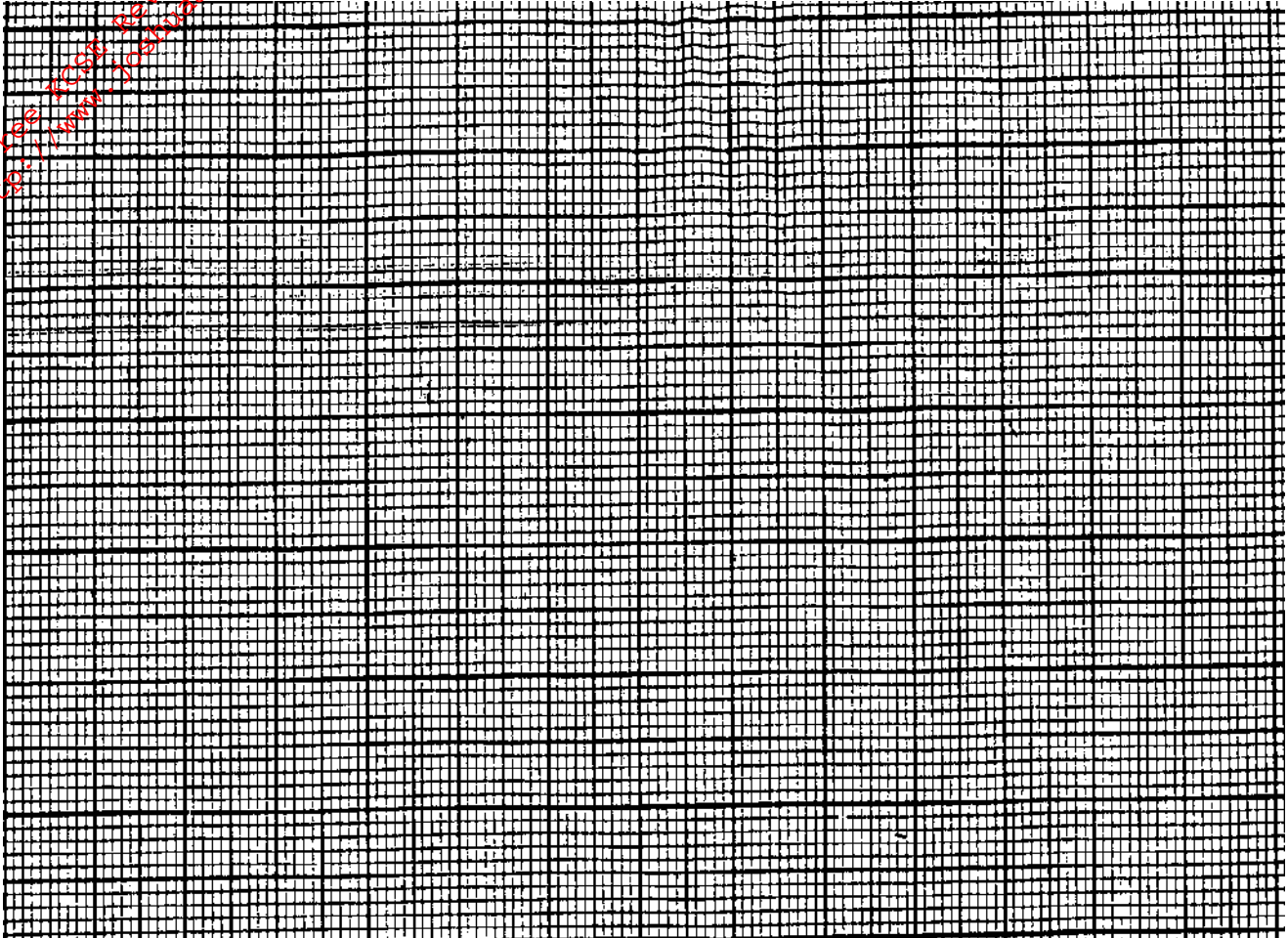
d) Describe fully a transformation that maps A, B, and C onto A, B, and C. (2mks)

21. a) The sum of two numbers is 30. Find their maximum product. (3mks)

b) A curve is given by the equation  $Y = 2x - \frac{1}{2}x^2 - 5x$ .

Determine the stationary points, hence state their nature. (5mks)

c) Sketch the curve. (2 mks)



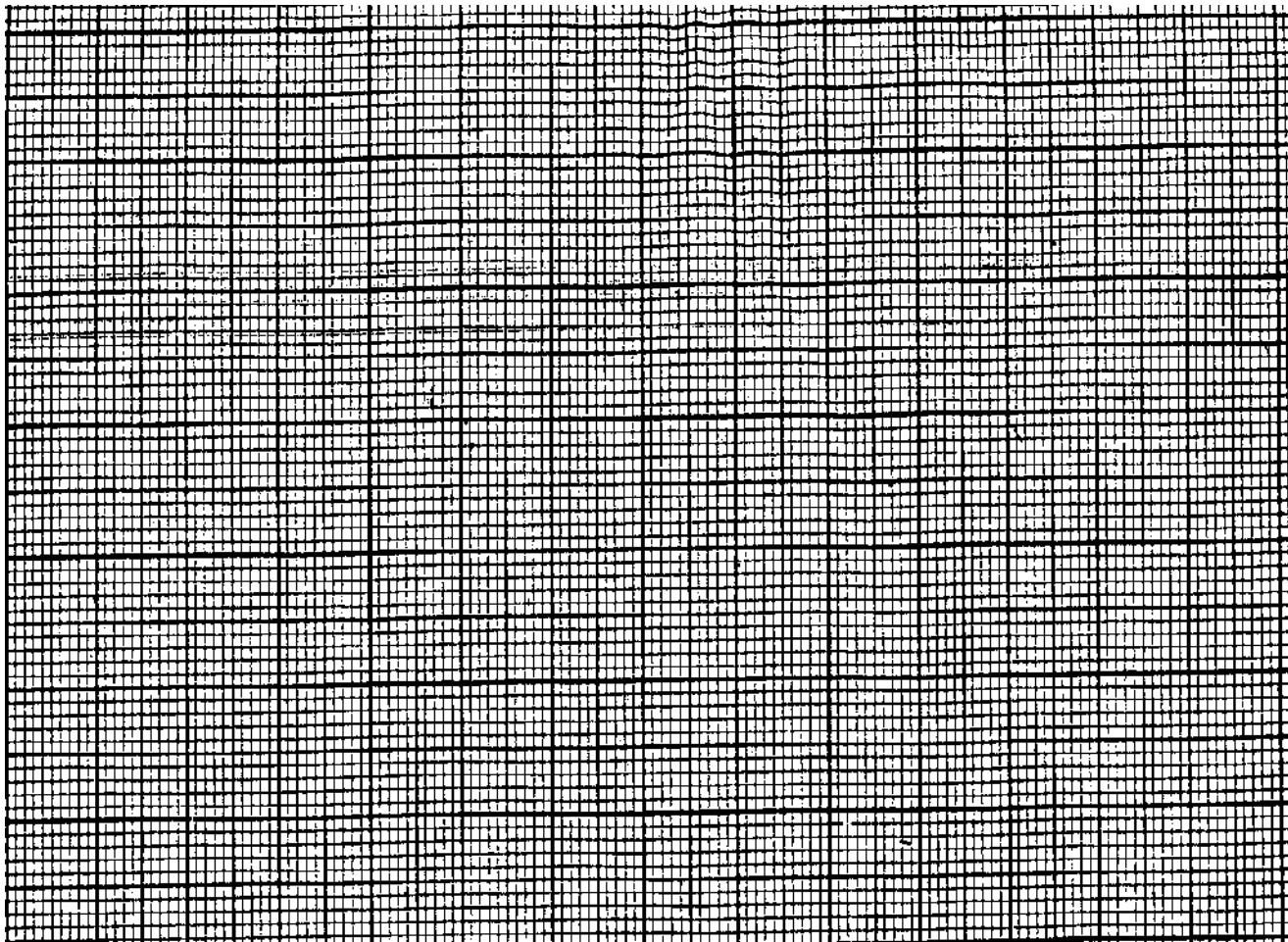
22. The table below shows corresponding measurements of two observed quantities which are believed to obey the law.  $Y = ax + bx$

X	1	2	3	4	5
y					

a) Copy and complete the table above. (2mks)

b) By Using a suitable scale, draw a straight line graph to represent this relationship. (4mks)

c) Use your graph to find the equation connecting y and x (4mks)



23. Two baskets X and Y contain identical ball except for the colours. Basket X contains 6 red ball and 3 black ball. Basket Y contains 2 red balls and 3 black balls.

a) If a ball is drawn at random from each basket, Find the probability that both balls are of the same colour. ( 4mks)

b) If two balls are drawn at random from each basket, one ball at a time without replacement, find the probability that .

i) The two ball drawn from basket X or basket Y are red. ( 4mks)

ii) All the four balls drawn are red. ( 2mks)

24. The figure below shows a triangle OAB in which  $OA = a$  and  $OB = b$ . The points P and Q are on AB and OB respectively such that  $AP:PB = 1:2$  and  $OQ:QB = 2:3$

a) Express in terms of  $a$  and  $b$ , the vectors:

i)  $\vec{AB}$

ii)  $\vec{AQ}$

iii)  $\vec{OP}$

(b) Given that  $\vec{AX} = m \vec{AQ}$  and  $\vec{OX} = n \vec{Op}$ , where  $m$  and  $n$  are scalars, write an expression for:

i)  $\vec{OX}$  in terms of  $\vec{a}$ ,  $\vec{b}$  and  $n$  (2mks)

ii)  $\vec{OX}$  in terms of  $\vec{a}$ ,  $\vec{b}$  and  $m$  (2mks)

iii) Solve for the values of  $m$  and  $n$  (3mks)