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GATITU SECONDARY SCHOOL P.O BOX 327- 01030 GATUNDU

FORM FOUR END OF TERM 1 MATHEMATICS EXAM

TIME 2 ½ HRS

NAME.....ADM.....

INSTRUCTIONS;

Answer all the questions in section A and any 5 in section B.

Show all your workings on the spaces provided below each question

1 Use logarithms tables to evaluate

(4mks)

$$\sqrt{3196^2 \times (0.024)^3} \\ 204.6$$

2 Evaluate

$$\sqrt[3]{\frac{0.064 \times 125}{347}}$$

(3mks)

3 Write the largest 6 digit number that can be formed using 4,2,0,8,3 and 6

(2mks)

4 Take a number X, double it and add five to the result. If this result is doubled again the new number is 22. Find X. (3mks)

5 Find the ratio p: r if

P:a =1 :2 ,a :b =2 :3 ,b: c =5 :1 ,c :r =3 :2

(3mks)

6 The line $y = -x$ intersect the line $2y = -3x + 10$ at a point A. Find the co-ordinates of A. (3mks)

7 Given that $3^{5x-2y} = 243$ and $3^{2x-y} = 3$ Calculate the values of x and y. (3mks)

8 Simplify

$$\frac{12x^2 - 16x}{20 - 11x - 3x^2}$$

(4mks)

9 Given the matrix $M \begin{pmatrix} 3 & -5 \\ 5 & 2 \end{pmatrix}$ find the inverse of M and hence solve the simultaneous equations (4mks)

$$3x - 5y = -9$$

$$5x + 2y = 16$$

10 A boat sails from a point A to a point B upstream a distance of 30km and back to A in 3 hours 12 minutes. The water is flowing at 5km/h. Determine the speed of the boat in still water. (5mks)

11 The equation of a circle is $x^2 + y^2 + 6x - 10y - 2 = 0$. Determine the co-ordinates of the center of the circle and its radius. (4mks)

12 Use gradient to show that a triangle whose vertices are A (1,3) B (4,-6) and C(4,3) is a right angled.
Find the area of this triangle. (5mks)

13 Simplify $\frac{10}{[2\sqrt{3} - \sqrt{7}]} \cdot \frac{10}{[2\sqrt{3} + \sqrt{7}]}$

(3mks)

14 Three quantities X, Y and Z are such that X varies directly as the square of Y and inversely as the square root of Z. Given that Y increases by 5% and Z decreases by 36%. Find the percentage change in X. (4mks)

SECTION B (50MKS)

15 In a certain science class $\frac{2}{3}$ of the class are boys and the rest girls. $\frac{4}{5}$ of the boys and $\frac{9}{10}$ of the girls are right handed and the rest are left handed. The probability that a right handed student will break a test tube in any session is $\frac{1}{10}$ and the corresponding probability for a left handed student is $\frac{3}{10}$ these probabilities being independent of the student's sex.

(a) Represent this information on a tree diagram (3mks)

(I) Using the diagram above find the probability that;

A student picked at random will be left-handed (2mks)

(ii) A test tube will be broken in the science class. (2mks)

(iii) A student picked at random will be a girl and will not break a test-tube (2mks)

(IV) There were no breakages. (1mk)

16 The table below shows the income tax for a certain year

Monthly taxable income (ksh)	Tax rates %
1.....9680	10%
9682.....18800	15 %
18801.....27920	20 %
27921.....37040	25%
37940 and above	30%

In that year Odero paid a net tax of ksh 5,512 per month. His total monthly taxable allowances amounted to ksh 15,220 and he was entitled to a monthly personal relief of ksh 1,162.

(a) Calculate Oderos monthly basic salary in ksh (8mks)

Every month the following deductions were made;

NHIF ksh 320

Union dues ksh 200

Co-operative shares ksh 7500

Calculate his net monthly salary

(2mks)

17 A triangle ABC with vertices at $A(1, -1)$, $B(3, -1)$ and $C(1, 3)$ is mapped onto triangle $A^1B^1C^1$ by a transformation whose matrix is $\begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}$

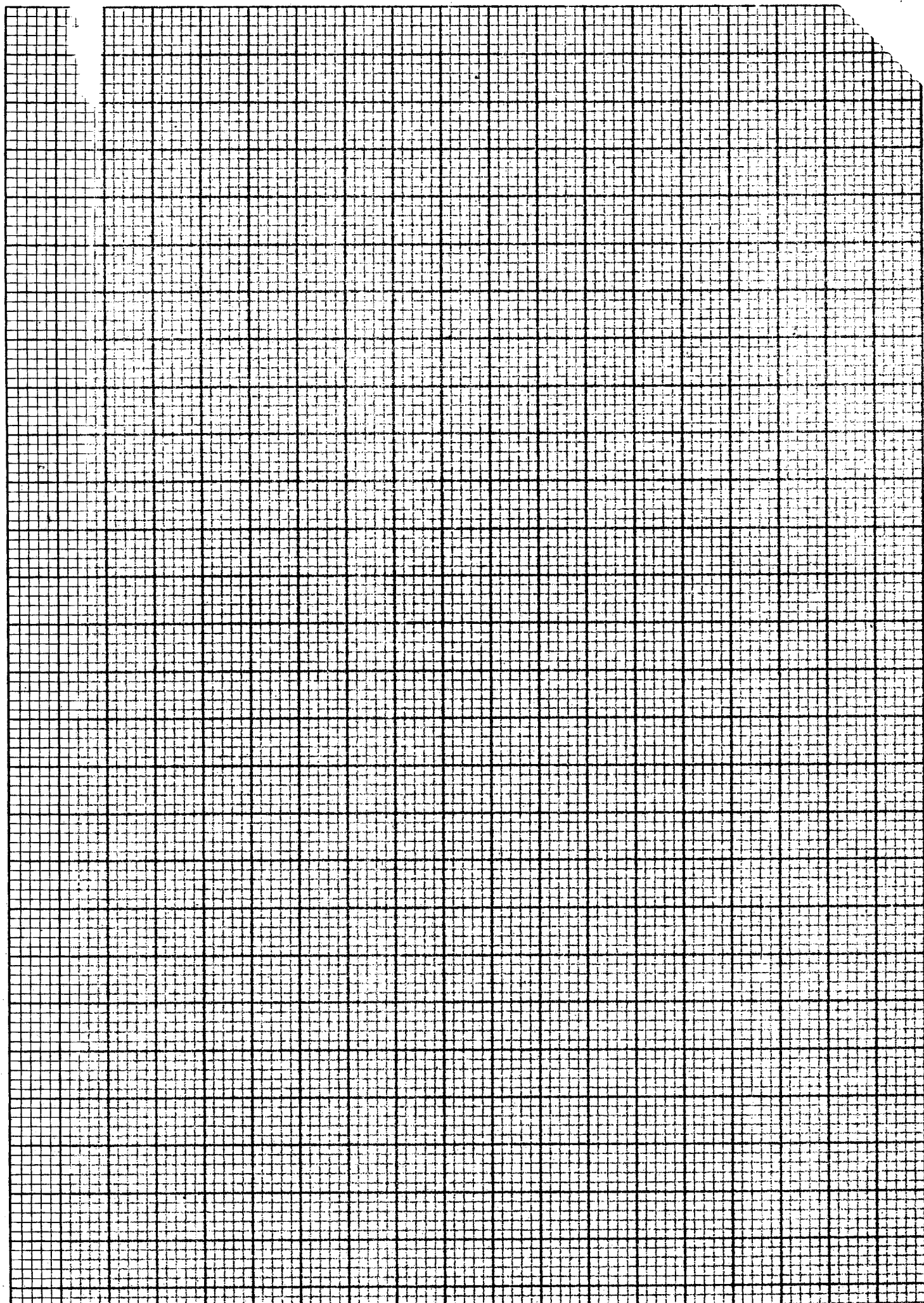
Triangle $A^1B^1C^1$ is then mapped onto $A^{11}B^{11}C^{11}$ with vertices $A^{11}(2, 2)$, $B^{11}(6, 2)$ and $C^{11}(2, -6)$ by a second transformation.

(i) Find the co-ordinates of $A^1B^1C^1$ (2mks)

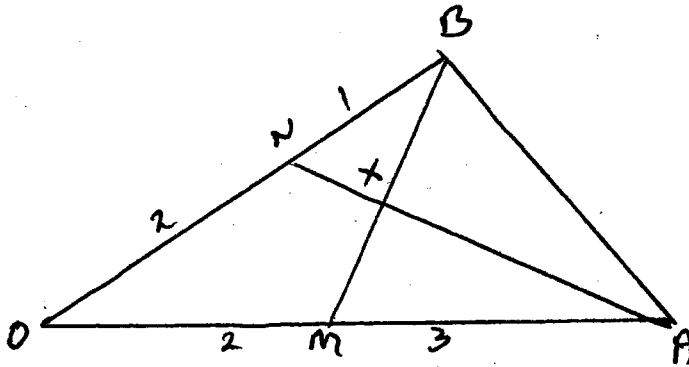
(ii) Find the matrix which maps $A^1B^1C^1$ onto $A^{11}B^{11}C^{11}$ (3mks)

(iii) Draw the three triangles ABC , $A^1B^1C^1$ and $A^{11}B^{11}C^{11}$ on the grid provided (3mks)

(iv) Find the transformation matrix which maps $A^{11}B^{11}C^{11}$ onto ABC (2mks)



18 In a triangle OAB, M and N are points on OA and OB respectively such that $OM : MA = 2 : 3$ and $ON : NB = 2 : 1$. AN and BM intersect at X.



Given that $OA = a$ and $OB = b$

(a) Express in terms of a and b

(i) BM

(ii) AN

(2mks)

(B) Taking $BX = t BM$ and $AX = h AN$ where t and h are scalars find two expressions for OX (4mks)

(c) Find the values of t and h

(4mks)

19 Three warships P Q and R are at sea such that ship Q is 400km on a bearing of 030° from ship P. Ship R is 750 km from ship Q and on a bearing of 120° from ship Q. An enemy warship S is sighted 1000km due south of ship Q.

(A) Taking a scale of 1 cm to represent 100 km locate the position of ships P, Q, R and S (4mks)

(b) Find the compass bearing of
(I) ship P from ship S

(II) Ship S from ship R

(2mks)

(C) Determine

(i) The distance of S from P

(II) The distance of R from S

(2mks)

(d) Find the bearing of

(i) Q from R

(II) P from R

(2mks)

20 A country bus left Nairobi at 10.45 am and travelled towards Mombasa at an average speed of 60 km/h. A matatu left Nairobi at 1.15 pm on the same day and travelled along the same road at an average speed of 100 km/h. The distance between Nairobi and Mombasa is 500km.

(a) Determine the time of the day when the matatu overtook the bus

(6mks)

(b) Both vehicles continue towards Mombasa at their original speeds. Find how long the Matatu had to wait in Mombasa before the bus arrived?

(4mks)