NAME.. INDEX NO..

CANDIDATE'S SIGNATURE... DATE:...

GATUNDU SUB COUNTY FORM FOUR 2018 EVALUATION EXAM

121/1
MATHEMATICS
PAPER I
JULY/AUGUST 2018
TIME: 2 ½ HOURS

INSTRUCTIONS TO CANDIDATES

(a)   Write your name and index number in the spaces provided above
(b)   Sign and write the date of exam in the space provided above.
(c)   This paper consists of two section : section I and section II
(d)   Answer all questions in section I and Only Five questions form section II
(e)   All answers and working must be written on the question paper in the space provided below each question.
(f)   Show all the steps in your calculation.
(g)   Marks may be given for correct working even if the answer is wrong.
(h)   Non –programmable silent electronic calculators and KNEC maths tables may be used except where stated otherwise.

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

GrandTotal

Section 1 answer all questions in this section (50 marks)

1. Without using a calculator evaluate,(3mks)

$$\frac{\frac{1}{2} \text{ of } 3\frac{1}{2} + 1\frac{1}{2}(2\frac{1}{2} - \frac{2}{3})}{\frac{3}{4} \text{ of } 2\frac{1}{2} + \frac{1}{2}}$$

2. Solve for x, given   (3 Marks)

$$\frac{27^{x-1}}{3^{2x-1}} = 81^{2x}$$

3. The exterior angle of a regular polygon is equal to one – third its interior angle. Calculate the number of sides of the polygon and give its name.   (3marks)

4. A bank in Kenya buys and sells foreign currencies as follows.

	buying (Ksh)	Selling (kshs.)
1 Us dollar	85.86	86.06
1 sterling pound	142.41	142.73

A tourist from united States of America converted 43521 US dollars into Kenya shillings.

i) Calculate the amount in Kenya shillings that she received (1 mark)

(ii)While in Kenya, the tourist spent sh. 2437821 and converted the balancetosterling pounds. How much in Sterling pound did the tourist receive to the nearest sterling pound?(3mks)

5. A Line passes through A (1, 1) and B(x, y). The mid-point of AB is (3, 5). If line BC is perpendicular to AB, find the equation of line BC in the form of ax +by +c= 0 (4mks)

6. A car park area in ashopping mall measuring 54 m by 72 m is covered by equal square tiles find the area in m² of the largest size of the tiles if whole tiles are used. (3 marks)

7. A minor arc of a circle subtends an angle of 120^0 at the centre of the circle. If the radius is 6.25 cm, find the length of the major arc giving your answer to 4 significant figures. (take $\pi = 3.142$). (2 marks)

8. Two similar container hold 2000cm³ and 6.75 litres respectively. If the smaller container is 15.5cm in diameter, what is the radius of the larger container to 1 decimal place? (3 mks)

9. Simplify fully the expression (3mks)

$$\frac{6x^2 - 9xy - 6y^2}{8x^2 - 2y^2}$$

10) Find the reciprocal of 20.95 to 4 decimal places using the tables of reciprocals. (1mark)

Hence evaluate $\dfrac{5}{20.95}$ without using mathematical tables or calculator.(2marks)

11) Write down the inequalities that define the unshaded region marked R in the figure below. (3mks)

12) Use Logarithm tables to evaluate   (4mks)

$$\sqrt{\frac{32.4 \times 0.04352}{(5.24)^2}}$$

13) Calculate the area of the shaded region below, given that AC is an arc of a circlecentre B. AB=BC=14cm CD=8cm and angle ABD = 75^0 (3marks)
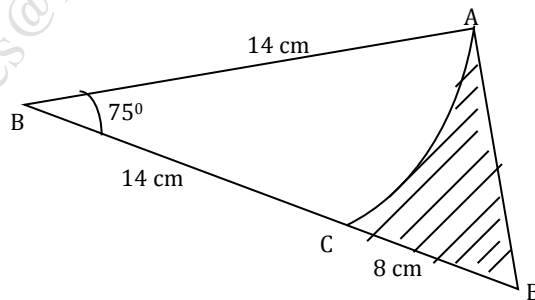
14) A boy whose eye level when standing is 1.6 m, stands in front of a building 30 m tall. He observes the top of the building at an angle of elevation of 42^0. Find the distance between the boy and the building leaving your answer correct to 4 significant figures. **(**3marks)

15)The figure below shows a sketch of a solid cuboid EFGHIJKL. Complete the sketch. (3mks)
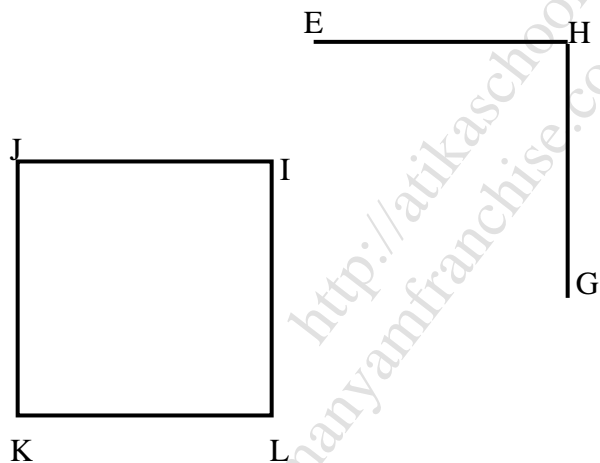
16)vector **p** passes through points (10,20) and (6,10) while **q** passes through points (x,12) and (-10,-18). If **p** and **q** are parallel, find x. (3 marks)

SECTION (50 MARKS)

Answer any five questions in this section in the spaces provided.

17.Atieno is a sales executive earning a salary of Ksh. 20,000 and a commission of 8% for the sales in excess of Ksh 100,000. If in January 2010 she earned a total of Ksh.48, 000 in salaries and commissions.

    a) Determine the amount of sales she made in that month   (4 mks)

    b) If the total sales in the month of February and March increased by 18% and then dropped by 25% respectively. Calculate

    (i) Atieno's commission in the month of February   (3 mks)

    (ii) Her total earning in the month of March   (3 mks)

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18. (a) Find the inverse of the matrix   (2 mks)

$$\begin{bmatrix} 2 & 5 \\ 4 & 3 \end{bmatrix}$$

(b) A transport company has two types of vehicles for hire: Lorries and buses. The vehicles are hired per day. The cost of hiring two lorries and five buses is Sh. 156,000 and that of hiring 4 lorries and three buses is Sh. 137,000.
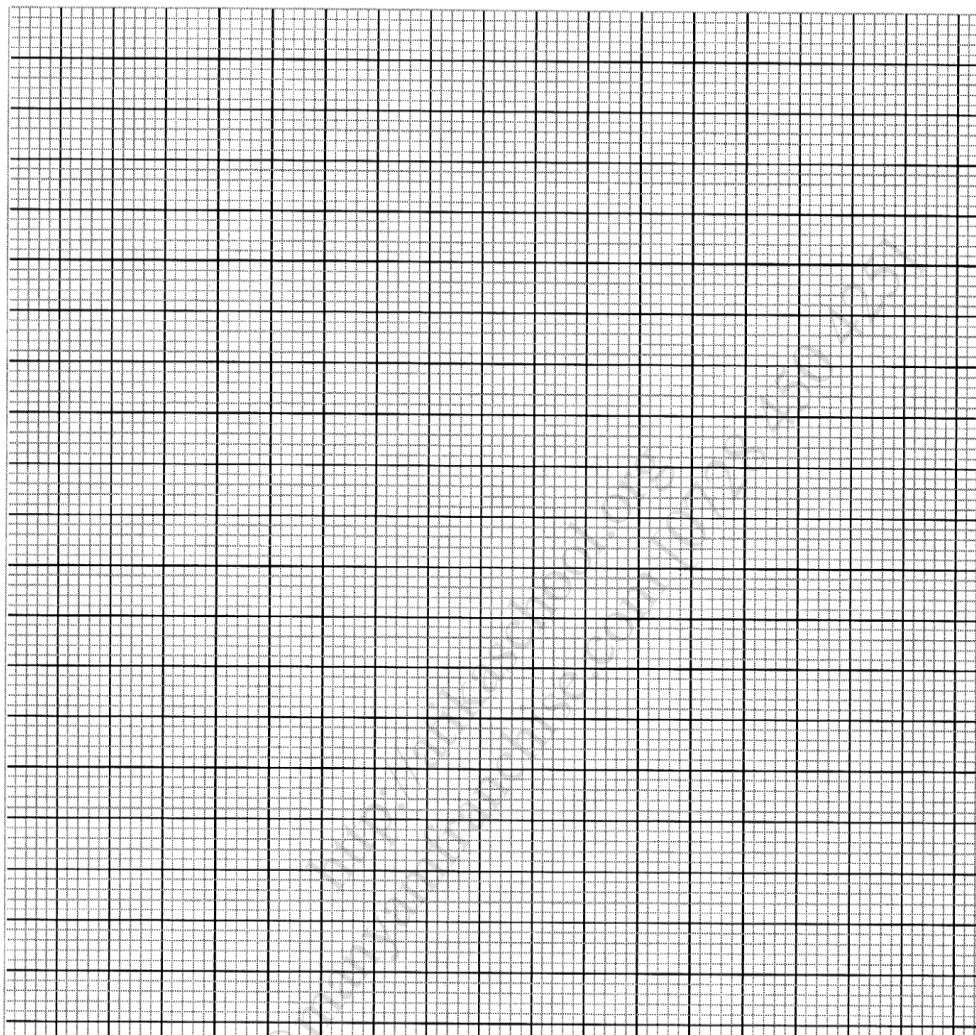
(i) Form two equations to represent the above information.   (2 mks)

(ii) Use matrix method to determine the cost of hiring a lorry and that of hiring a bus.

(3 mks)

(c)   Find the value of x given that $\begin{bmatrix} 2x - 1 & 1 \\ x^2 & 1 \end{bmatrix}$ is a singular matrix   (3 mks)

19. a) The points A(2, 6), B(1, 1) C(3, 4) and D(5, 3) are vertices of a quadrilateral ABCD. Plot ABCD on the grid below to form quadrilateral ABCD. (2 mark)


b) ABCD undergoes a rotation of positive 90^0, about the origin. on the same grid, draw the image A'B'C'D' and state the coordinates of A'B'C'D'. (3 marks)

c) A'B'C'D' undergoes a reflection in the X – axis to give A''B''C''D''. On same grid, draw A''B''C''D'' and state the coordinates of A''B''C''D'' (3 marks)

d) A''B''C''D'' is the image of ABCD under a reflection. On the grid, mark the mirror line and state its equation. (2 marks)

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20. The figure below shows a bucket of depth 30cm used to fill a cylindrical tank of radius 1.2m and height 1.35m which is initially three-fifth full of water.
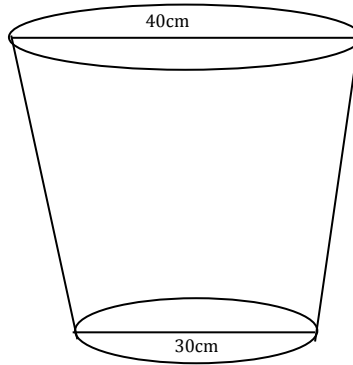
Calculate;
  (a) The capacity of the bucket in litres   (5mks)

(b)The volume of water required to fill the tank in litres   (2mks)

(c)Calculate the number of buckets that must be drawn to fill the tank   (3mks)

21.) Forty students in a form 2 class were weighed and their masses recorded to the nearest kilogram as shown below.

45	48	56	39	47	36
45	37 46	35	43	51	42
47	47	40	46	41	
45 43	46	54	42	51	39
42	45	44	49	50	46
39 42	48	50	38	45	35
52	46				

a) Starting with the class 35-39 tabulate this data in a frequency table   (2marks)

b) Find the modal frequency   (1 mark)

c) calculate the mean mass of the students   (4marks)

d)Estimate the median mass   (3marks)

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22.)Four ships are at sea such that a streamliner S is 150km on a bearing of 025° from a cargo

ship C. A trailer T is 300km on a bearing of 145° from the cargo ship and a yacht Y is due

West of C and on a bearing of 300° from T.

   a) Using a scale of 1cm= 50km, draw on accurate scale drawing showing the positions of S, C, T and Y   (4marks)

b) By measurement from your scale drawing determine:

   i) The distance and bearing of Y from S   (2marks)

   ii) The distance ST   (2marks)

   iii) The distance YT   (2marks)

23)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**(1mark)

(ii) **AN**(1mark)

(b) Taking BX = kBM and AX =hAN where **k** and **h** are constants express **OX** in terms of

   (i) **a, b** and **k** only   (2marks)

   (ii)   **a, b**, and **h** only   (2marks)

(c) Use the expressions in **(b)** above to find values of **k** and **h**(4marks)

24) The table below gives some values of X and Y for the function $y=\frac{1}{2}x^2 + 2x + 1$ in the interval **0≤x≤6**

a) Complete the values in the table below(2marks)

X	0	1	2	3	4	5	6
Y			7			23.5	

b) Using the values, estimate the area bounded by the curve, x-axis ,y-axis and the line x=6 by the trapezium rule ,use 6 trapezia (3marks)

c) By integration, calculate the exact area bounded in (a) above (3marks)

d) Find the percentage error made, when the trapezium rule is used, to 2.d.p (2mks)

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