

KASSU JOINT EVALUATION TEST
MATHS P2
2 ½ HOURS

INSTRUCTIONS TO CANDIDATES

1. Write your name, admission number and class in the space provided at the top of this page
2. The paper contains TWO sections; section I and section II
3. Answer all the questions in section I and any five in section II
4. Show all the steps in your calculation; giving your answers at each stage in the spaces provided below each question each question
5. Marks may be given for correct working even if the answer is wrong.
6. Non- programmable silent electronic calculators and KNEC mathematical tables may be used.

1. Use logarithm tables only to evaluate

$$\sqrt[7]{\frac{0.004847 \times 592.34}{\tan 49.7^\circ}}$$

(4mks)

2. Factorize and simplify

(2mks)

$$9x^2 - 25y^2$$

$$6X^2 + 19XY + 15y^2$$

(2mk)

3. Osako uses $\frac{1}{5}$ of his piece of land to keep poultry, $\frac{2}{3}$ for bulls, $\frac{1}{5}$ of the remainder for goats and the rest for sheep. If he uses 12 hectares for goats, determine the total number of hectares he uses for sheep.

(3mks)

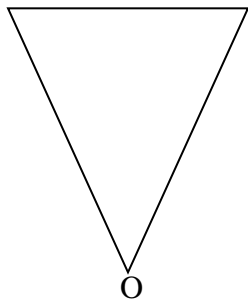
4. Points A(-2,4) and B(4,1) form a chord of a circle whose centre is at K. Find the equation of the perpendicular from K to chord AB.

(4mks)

5. A metal Q is made by mixing two metals M and N. Metal M has a mass of 68g and density of 17g/cm^3 . Metal N has a mass of 18g and a density of 3g/cm^3 . Find the density of metal Q.

(3mks)

6. The diagram below is part of a figure which has rotational symmetry of order 3 about O.



Complete the figure

(2mks)

- b) If each face is an equilateral triangle of side 5cm, find the surface area of the solid.

(2mks)

10. Given that a 2M perimeter fence is 18M away from a building. A trench is dug deep at the foot of the fence. The angle of elevation of the top of the building from the bottom of the trench is 30° , while the angle of depression of the top of the perimeter fence from the top of the building is 20° . Find the depth of the trench. (4mks)
11. A rectangle measures 11cm by 7cm. The length and breadth of the rectangle are both reduced by the same amount x cm. If the new rectangle is of area 45cm^2 , find the value of x . (3mks)
12. A quantity P is partly constant and partly varies as the cube of Q . When $Q=1$, $P=23$ and when $Q=2$ $P=44$. Find the value of P when $Q=5$ (3mks)
13. A geographical globe has a radius of 3.5cm P and Q are two points on its surface such that P has a latitude of 60°N and longitude 90°W . Q has latitude 50° and longitude 90°E . A piece of string stretches from p to Q passing through the North pole. By taking π to be $\frac{22}{7}$, find the length of the string to 4 s.f (3mks)
14. Express as a single fraction with a rational denominator

$$\frac{5}{3\sqrt{2}-\sqrt{3}} - \frac{2}{3\sqrt{2}+\sqrt{3}} \quad (3\text{mks})$$

15. The numbers 8, x , and 2 form the first three terms of a geometric progression. Find the sum of the first five terms of the G.P if its common ratio is negative. (3mks)

16. Complete the table below for $y= 8-2x-x^2$ for $-4 \leq x \leq 2$.

X	-4	-3	-2	-1	0	1	2
Y							

Hence use the trapezium rule with six strips to find the area of the region bounded by the curve and the x -axis. (3mks)

SECTION II

17. i) A salesman earned a commission of shs. 4,000 from the sale of goods worth shs. 20,000 (2mks)
- a) What was the commission rate (2mks)
- b) The man later sold goods whose marked price was Shs. 480,000 allowing 3% discount. How much commission did he receive? (2mks)
- ii) A trader offers a special discount of 10% on all items that he sells. The cost price of an item is Ksh. 12,000, which he sells at the discounted price and still makes a 20% profit. What is his cost price on this item. (3mks)
- iii) A woman bought 125 tomatoes at shs. 2.00 each
- a) If she sold them at a profit of 30% what was her actual profit. (1mk)
- b) At how much should she have sold each tomatoes to get a profit of 60% (2mks)

18 a) complete the table below for the graph of $y = \cos(4x - 60^\circ)$ for $0^\circ \leq x \leq 180^\circ$ (2mks)

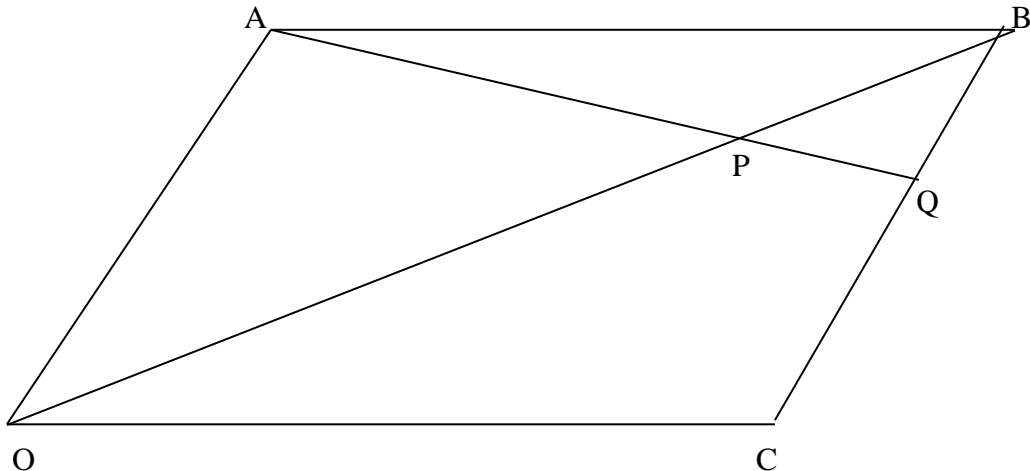
X	0	15	30	45	60	75	90	105	120	135	150	165	180
4x	0	60	120	180	240	300	360	420	480	540	600	600	
$4x - 60^\circ$	-60		60		180	240	300		420	480	540		
$Y = \cos(4x - 60^\circ)$	0.5		0.5	-0.5	-1		0.5						

- b) Using the scale of 1cm to represent 15° on the x-axis and 4cm to represent 1 unit on the y-axis, draw the graph of $y = \cos(4x - 60^\circ)$ for $0^\circ \leq x \leq 180^\circ$ (3mks)
- c) Use your graph to solve the equations (1mk)
- i) $1 + \cos(4x - 60^\circ) = 1$
- ii) $5 \cos(4x - 60^\circ) = 1$ (2mks)
- d) State the period and the phase angle of the graph (2mks)

19. The table below shows the ages of people in years who attended a wedding ceremony.

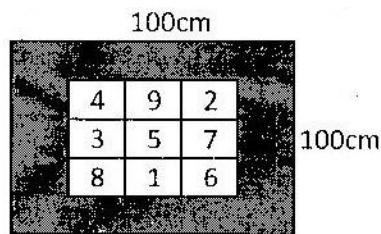
Age in years	10-19	20-29	30-39	40-49	50-59	60-69	70-79
Frequency	2	4	4	8	6	3	2

- a) State the modal class (1mk)
- b) Using an assumed mean of 44.5 calculate the (3mks)
- i) mean age (3mks)
- ii) Standard deviation (3mks)
- iii) Calculate the median age (3mks)
20. ABC is a triangle with vertices at $a(3,1)$ $B(5,2)$ and $C(3,4)$. R_1 is anti-clockwise rotation of 90° about the origin. R_2 is a clockwise rotation of 270° about $(0,0)$ and M is a reflection in the line $y=0$.
- a) Use the grid provided to plot on the same diagram (1mk)
- i) ∇ABC
- ii) $R_1(\nabla ABC)$ and state its co-ordinates. (2mks)
- iii) $R_1(\nabla ABC)$ and state its co-ordinates (2mks)
- b) Describe the single transformation which would map $R_2 MR_1(\nabla ABC)$ onto ∇ABC .
21. In the diagram below, OABC is a parallelogram. OA is parallel to CB and OC is parallel to AB. $OP = \frac{3}{4} OB$ and APQ is a straight line $OA=a$ and $OC=b$



- a) Express the following in terms of a and b. (1mk)
 i) OP (1mk)
 ii) AP (1mk)
- b) Given that $AQ=kAP$ and $CQ=mCB$ where m and k are scalars, express OQ in two ways. (3mks)
- c) Hence find the value of k and m. (3mks)
- d) Find the ratio which P divide AQ. (2mks)

22.



- In a game at a Nakuru club, darts are thrown at the board as illustrated in the figure above. The outer square is of side 100cm and each of the inner squares is of side 20cm. The number shown in each region is the score obtained by a dart hitting that region. A dart hitting the shaded region scores O. Assume that all darts hit the board and that each point on the board is equally likely to be hit.
- a) Calculate the probability that, with one dart, the score will be
 i) At least 7 (2mks)
- b) Find the probability that, with one dart, the score will be
 i) At least 7 (2mks)
 ii) O (2mks)
- c) Each turn consists of throwing 3 darts. Calculate the probability of scoring
 i) A total of 18 with the first two darts (2mks)
 ii) A total of 26 with the three darts. (2mks)
23. Find the co-ordinates of the stationary
 a) Points of the curve $y=5x-x^2$ (3mks)
 b) Sketch the curve in (a) above. (2mks)
 c) Calculate the area enclosed between the curve, the line $y=5-x$ and the line $x=2$.

24. A man has 12 hectares of land available for growing peas and beans. Each hectare of peas that he plants costs him $f70$ and involves him 18 hours of labour, while each hectare of beans that he plants costs him $f150$ and involves him 5 hours of labour. He has $f1050$ and 90 hours of labour available.
- a) Let x hectares and y hectares be the areas that he uses to grow peas and beans respectively and write down three inequalities other than $x \geq 0$ and $y \geq 0$ (3mks)
- b) Using 1 cm to denote 1 hectare on both the x -and the y axes, draw a graph to illustrate these inequalities. (4mks)
- c) Use your graph to estimate the largest amount of land that he can use for growing peas and beans. (3mks)