SKY-SCORES SERIES
2025 PAPER 2

NAME:……ADM NO……CLASS……

DATE……SIGN:…….

121/2
MATHEMATICS
PAPER 2
TIME: 2 ½ HOURS

INSTRUCTIONS TO CANDIDATES

1. Write your name, index number, class and school in the spaces provided above.
2. This paper consists of TWO sections I & II
3. Answer ALL the questions in section I and only FIVE questions from section II
4. All answers and working must be written on the question paper in the spaces provided below each question.
5. Show all the steps in your calculations giving your answers at each stage in the spaces below each question.
6. Marks may be given for correct working even if the answer is wrong.
7. Non-programmable silent electronic calculators and KNEC mathematical tables may be used except where stated otherwise.

FOR EXAMINERS USE ONLY

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	TOTAL

17	18	19	20	21	22	23	24	TOTAL

GRAND TOTAL

SECTION I (50 MARKS)

Answer ALL Questions in this Section

1. By the completing the square method solve for x in $4\ x^2 + 6x = 5$ (3mks)

2. The length and width of a rectangle is stated as 12.40cm and 8.5cm respectively. Calculate the percentage error in the area of the rectangle. (3mks)

3. Solve the equation sin 2x = 0.6428 for values of x in the range $-180 \leq x \leq 180$ (4mks)

4. Given that $\frac{3}{3+\sqrt{5}} + \frac{3\sqrt{5}}{3-\sqrt{5}} = a + b\sqrt{5}$. Find the values of a and b (3mks)

5. In a shooting practice three soldiers A, B and C aim at a target. The probabilities of A, B or C hitting the target are $\frac{1}{3}$, $\frac{1}{4}$ and $\frac{1}{2}$ respectively. The three soldiers shoot at the target only once; one after the other. What is the probability that the target was hit only once? (3mks)

6. The cash price of a cooker was shs.7500. Fatuma bought it on hire purchase by first making a down payment of shs.2250 and 15 equal monthly instalments of shs.550 each. Calculate the carrying charge and the rate of interest charged per month (3mks)

7. Given that log8=0.9031 and log7=0.8451 find log 87.5 (3mks)

8. Two chords PQ and RS are parallel and 2cm apart. If PQ = 8cm and RS = 10cm, find the radius of the circle (3mks)

9. The square of a quantity m varies partly as the square of t and partly as the cube of r. Find the percentage change in r when m and t are each decreased by 10% (3mks)

10. (a) expand $(a-b)^6$ (1mk)

(b) Use the first three terms of the expansion in (a) to find the approximate value of $(1.98)^6$

(2mks)

11. The first, the third and the seventh term of an increasing arithmetic progression are three consecutive terms of a geometric progression if the first term of the arithmetic progression is 10. Find the common difference of the arithmetic progression (3mks)

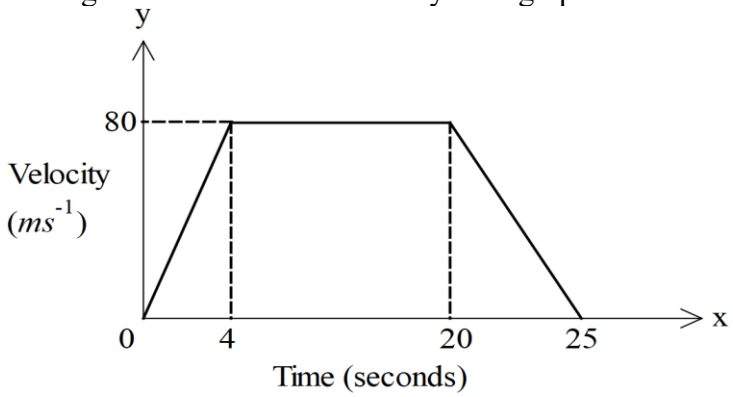
12. State the amplitude, period, phase angle and phase shift given that $y = 3sin\left(\frac{1}{2}x - 60\right)$. (3mks)

13. Find the equation of a circle that passes through (2,0) and (8,0) and also touches the y-axis (3mks)

14. Pipe X can fill an empty tank in 3 hrs while pipe Y can fill the same tank in 6 hrs. When the tank is full it can be emptied by pipe Z in 8 hrs. Pipe X and Y are opened at the same time when the tank is empty. If one hr later pipe Z is also opened, find the total time taken to fill the tank. (3mks)

15. A transformation is represented by the matrix $\begin{pmatrix} 1 & 2 \\ 3 & 2 \end{pmatrix}$. This transformation maps a triangle ABC of the area $3cm^2$ onto another triangle $A'B'C'$. Find the area of triangle $A'B'C'$. (3mks)

16. The figure below shows a velocity time graph for a car



(i) Find the total distance travelled by the car (2mks)

(ii) Calculate the deceleration of the car (2mks)

SECTION II (50 MARKS)

Answer only five questions from this section

17. The distribution of masses (to the nearest kg) of 100 men was as follows.

Mass(kg)	50-54	55-59	60-64	65-69	70-74
No of men	1	2	4	12	22
	75-79	80-84	85-89	90-94	95-99
	20	18	11	6	4

(a) Calculate the semi-interquartile range (3mks)

(b) Using an assumed mean of 67, calculate

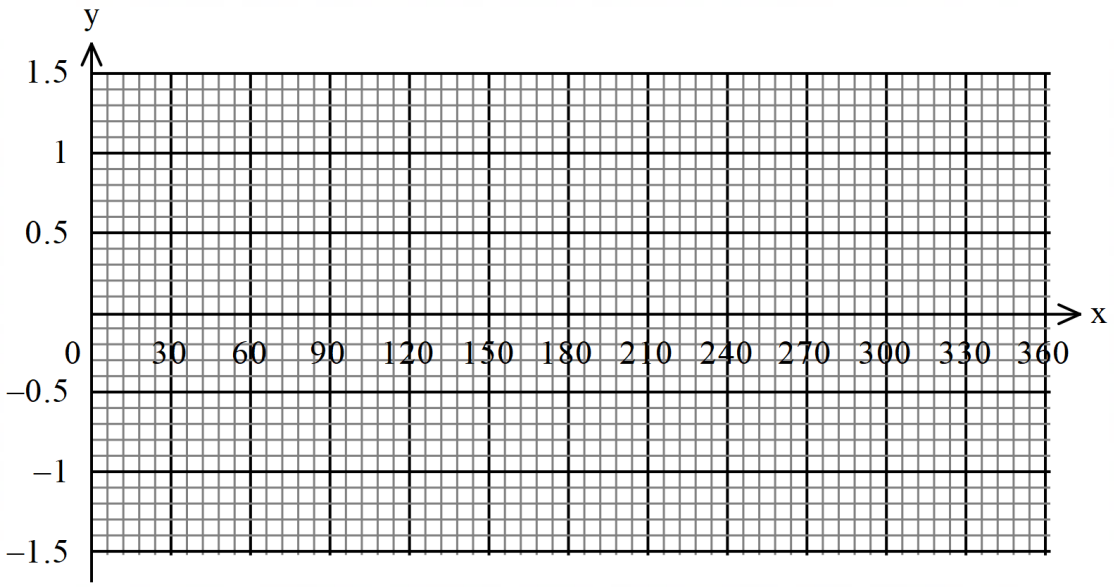
(i) The mean (3mks)

(ii) The standard deviation (4mks)

18. (i) Use the graph of $y = cos2x$ and $y = -\frac{1}{2}sin2x$ to fill the table below for $0^0 \leq x \leq 720^0$. (2mks)

x	0^0	60^0	120^0	180^0	240^0	300^0	360^0
$cos2x$							
$-\frac{1}{2}sin2x$							

(ii) On the same grid draw the graph of $y = cos2x$ and $y = -\frac{1}{2}sin2x$ (2mks)



(iii) State the period and the amplitude of the two waves (2mks)

(iv) Use the graph to solve the equation given by $-\frac{1}{2}sin2x = cos2x$ (2mks)

(v) Identify two transformations that maps the graph of $y = -\frac{1}{2}sin2x$ onto the graph of $y = cos2x$ (2mks)

19. An aircraft takes off from an airport at P ($65^{0}N, 36^{0}E$) and flies by the shortest route to another airport at Q $\left(K^{0}N,\ 144^{0}W\right)$ covering a total distance of 4,800 nautical miles

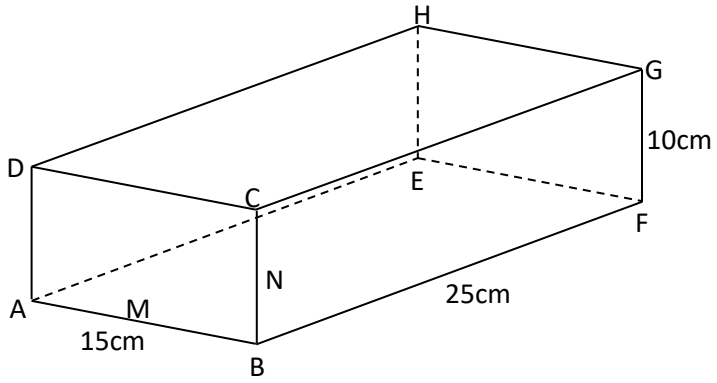
(a) Find the value of K (3mks)

(b) If instead the aircraft had flown along latitude 65^{0} N and then along meridian 144^{0} W to point Q, find how much further it would have flown in nautical miles. (3mks)

(c) Two aircrafts take off from P and Q at the same time. Given that both fly at the same speed and that one follows the shortest route and the other flies the route described in (ii) above, state the position of the second aircraft at the time the first is landing at Q. (2mks)

(d) If the aircraft arrived at airport Q at 1846hrs local time, what was the local time at airport P? (2mks)

20. The figure below shows a cuboid ABCDEFGH width 15cm, length 25cm and a height of 10cm.



Points M and N are midpoints of AB and BC respectively. Another point Q (not shown) lies on MN such that MQ=QN. Calculate the angle between

(a) Line CE and plane CGHD (3mks)

(b) Line NE and plane ABFE (2mks)

(c) Lines MN and FH (2mks)

(d) Planes QEH and FGHE. (3mks)

21. The figure KLMN below is a scale drawing of a rectangular piece of land of length KL=80m.

(a) On the figure, construct;

(i) The locus of a point P which is both equidistant from points L and M and from lines KL and LM (3mks)

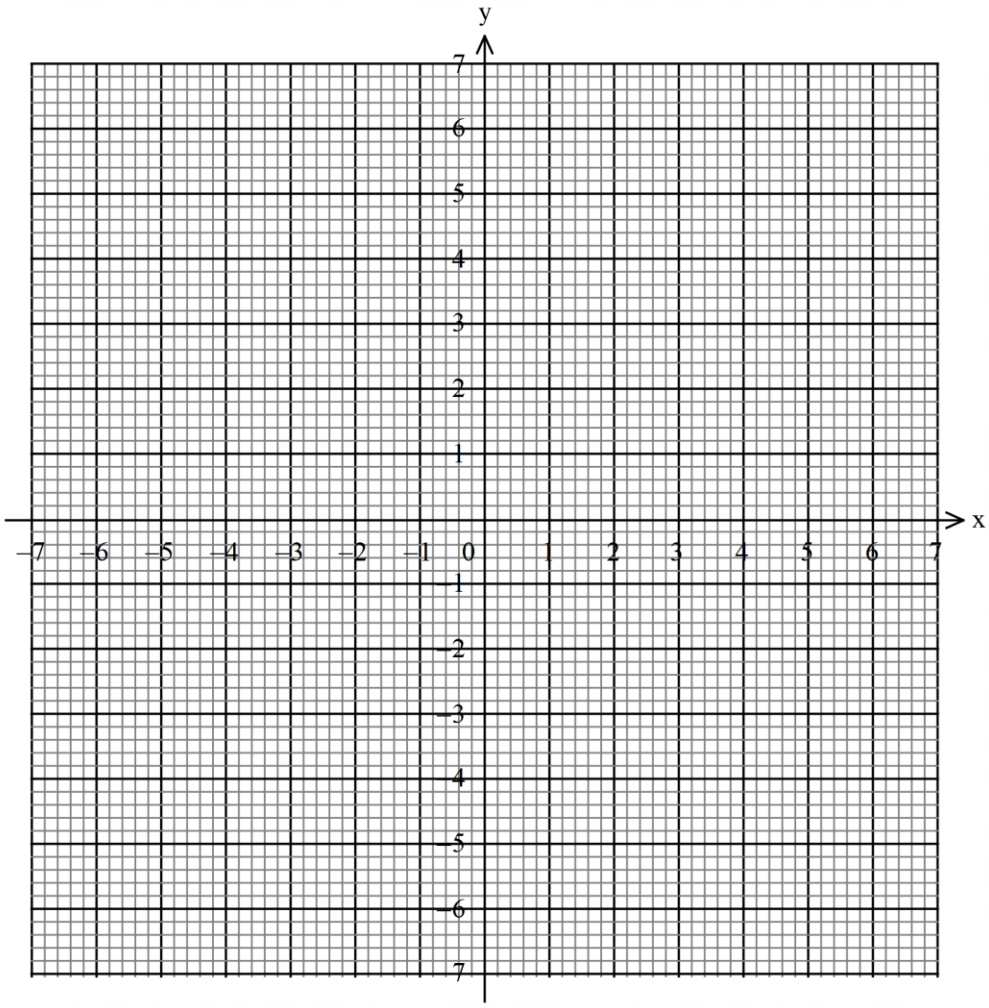
(ii) The locus of a point Q such that <KLM=90^0. (2mks)

(b) (i) Shade the region R bounded by the locus of Q and the locus of points equidistant from KL and LM (2mks)

(ii) Find the area of the region R in m^2. (Take π=3.142) (3mks)

22. A quadrilateral $ABCD$ has vertices A (4, -4), B (2, -4), C (6, -6), D (4, -2).

(a) On the grid provided draw the quadrilateral $ABCD$ (2mks)



(b) $A'B'C'D'$ is the image of ABCD under a positive quarter turn about the origin. On the same grid draw the image $A'B'C'D'$. (2mks)

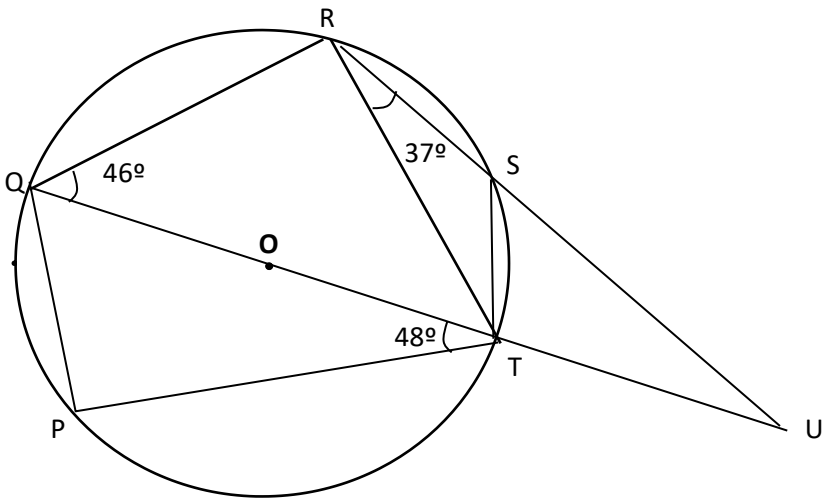
(c) $A''B''C''D''$ is the image of $A'B'C'D'$ under the transformation given by the matrix $\begin{pmatrix} 1 & -2 \\ 0 & 1 \end{pmatrix}$.

(i) Determine the coordinates of $A''B''C''D''$. (2mks)

(ii) On the same grid draw the quadrilateral $A''B''C''D''$. (2mks)

(d) Determine a single matrix that maps $ABCD$ onto $A''B''C''D''$ (2mks)

23. In the diagram below, line QOT is a diameter. ∠QTP = 48º, ∠TQR = 46º and ∠SRT = 37º



Calculate, giving reasons in each case: -

(a) ∠RST (2mks)

(b) ∠SUT (2mks)

(c) ∠ROT (2mks)

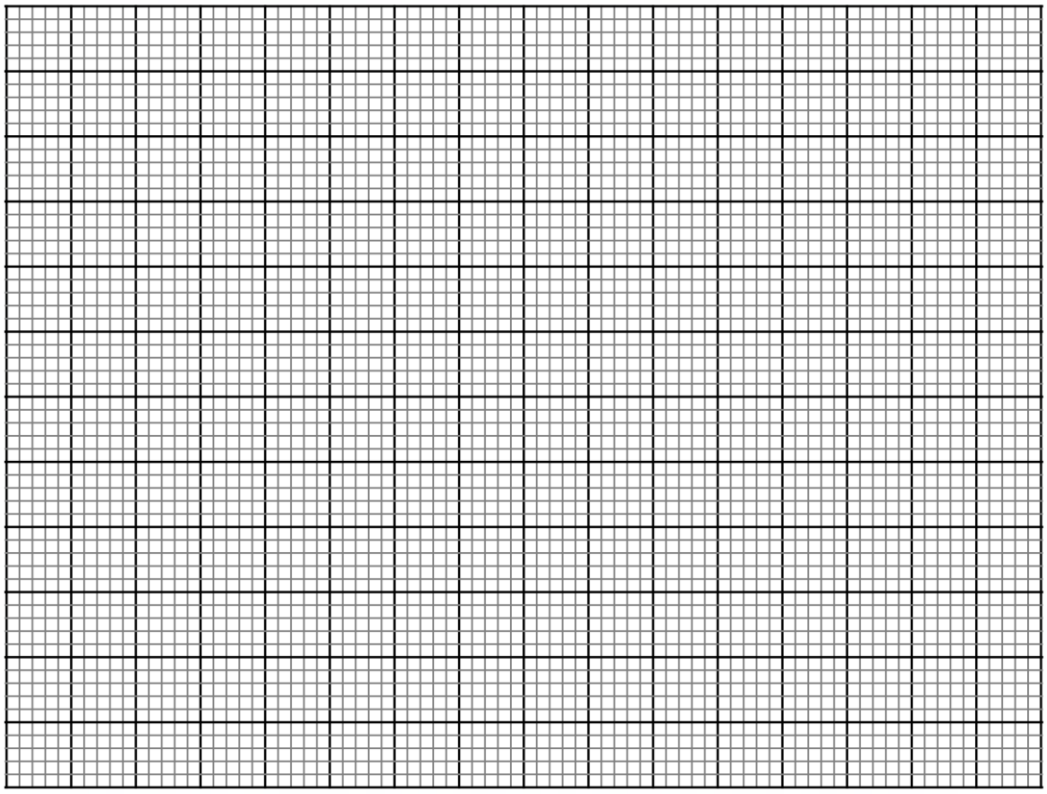
(d) ∠PST (2mks)

(e) Reflex ∠SOP (2mks)

24. A tailoring business makes two types of garments, A and B. Garment A requires 3metres of material while garment B requires $2\frac{1}{2}$ metres of material. The business uses not more than 600metres of material in making both garments. It must make not more than 100 garments of type A and not less than 80 of type B each day.

(a) Write down four inequalities to represent the above information. (4mks)

(b) Graph the above inequalities (3mks)



(c) If the business makes a profit of shs80 on garment A and a profit of shs60 on garment B, how many garments of each type must it make to maximize its total profit (assume all the garments are sold on the same day). (3mks)