NAME……ADM NO: ……...……

SCHOOL...……CLASS.

121 / 2
MATHEMATICS
PAPER 2
2 ½ HOURS

TERM 2 2026

INSTRUCTIONS TO CANDIDATES

1. *Write your name and index number in the spaces provided at the top of this page.*
2. *This paper consists of two sections:* ***Section I and Section II.***
3. *Answer* ***all*** *questions in* ***section I*** *and* ***any five questions*** *from* ***Section II.***
4. *Show all the steps in your calculations, giving your answers at each stage in the spaces below 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.*

For Examiner's Use Only

SECTION I

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

Grand Total

This paper consists of18 printed pages. Candidates should check the question paper to ensure that all the pages are printed as indicated and no questions are missing.

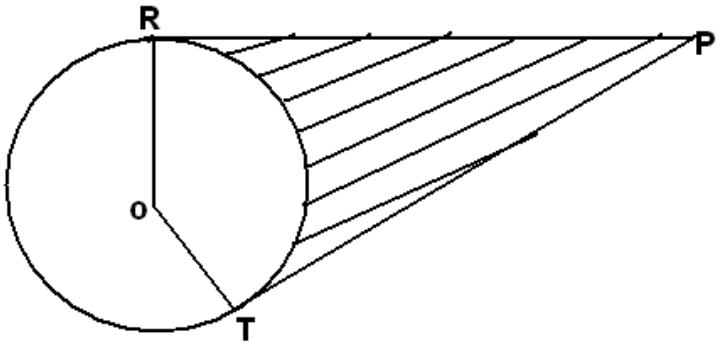
SECTION 1(50 MKS)

1. Find the value of x that satisfy the equation $\text{Log}(x + 5) = \log 4 - \log (x + 2)$ (3mks)

2. Into 2 decimal places, find the distance between the centre of two circle A and B given that their equations are:
   $2x^2 + 2y^2 + 6x - 10y + 7 = 0$ and $x^2 + y^2 + 8x - 2y + 4 = 0$ respectively. (4mks)

3. Make S the subject of the formulae. $a = \sqrt{\frac{S^2 + q}{p^2}}$ (3mks)

4. In the figure below, PR and PT are tangents. O is the centre of a circle diameter 42cm. The reflex $\angle ROT$ is 240^0



Using $\pi = \frac{22}{7}$, **find** the area of the shaded region. (3mks)

5. The third, fifth and eighth terms of an arithmetic progression are consecutive terms of a geometric progression. Given that the first term of the AP is 8, **determine** the common difference and the common ratio. (3mks)

6. Two places A and B are 900km apart on the earth surface. If A is due North of B and given that the latitude of A is 5^0N. Find into 1 decimal place the latitude of B. (Take radius of earth to be 6370km). (3mks)

7. A plot costs 600000 currently. If the rate of appreciation is 15% per annum, find to the nearest whole number the number of years it will take to appreciate to Ksh.1049404. (3mks)

8. A varies partly as B and partly as the square root of B. When B = 4, A = 22 and when B = 9, A = 42. Find A when B = 25. (3mks)

9. The floor of a rectangular room measures 4.8m by 3.2m. Estimate the percentage error in the area. (3mks)

10. There are two grades of tea, grade A and grade B. Grade A costs Ksh. 80 per kg and grade B cost Sh.60 per kg. **In what** ratio must the two be mixed in order to produce a blend worth Sh. 75 per kg. (3mks)

11. (a) **Write** down the first four terms of the binomial expansion of $(3 - 2x)^5$. (2mks)

(b) Hence, use your expansion to estimate correct to 3 decimal places the value of $(2.98)^5$. (2mks)

12. A cylindrical solid has a total surface area of 836cm^2.If its height is 12 cm, determine its radius.(take $\pi = 22/7$) (4mks)

13. The position vectors for points A and B are $5\underset{\sim}{i} + 4\underset{\sim}{j} - 6\underset{\sim}{k}$ *and* $2\underset{\sim}{i} - 2\underset{\sim}{j}$ respectively. A point X divides AB in the ratio **-2:5. Find** the coordinates of X. (3mks)

14. Rationalize and simplify $\frac{3}{2-3\sqrt{2}} + \frac{5}{2+3\sqrt{2}}$ upto the form $a + b\sqrt{c}$ where a, b and c are integers.
(3mks)

15. Find the equation of a normal to the curve $y = 3x^2 - 9x + 1$ at the point where x =3.
(3mks)

16.



Using rectangle ABCD above, Show the locus of R by shading if it moves inside the rectangle such that.

(i) It is always nearer to AB than AD

(ii) It is at least 3cm from point B.

(3 Mks)

SECTION II (50 MARKS)

Answer any five questions in this section.

17. Income rates for income earned were charged as follows.

Income in Ksh p.m	Rate in Ksh per sh.20
1 – 8400	2
8401 – 18,000	3
18,001 – 30,000	4
30,000 - 36,000	5
36,001 - 48,000	6
48,001 and above	7

A civil servant earns a monthly salary of Ksh.19,200. His house allowance is Ksh 12,000 per month. Other allowances per month are transport Ksh.1300 and medical allowance Ksh.2300. He is entitled to a family relief of Ksh1240 per month.

Determine:-

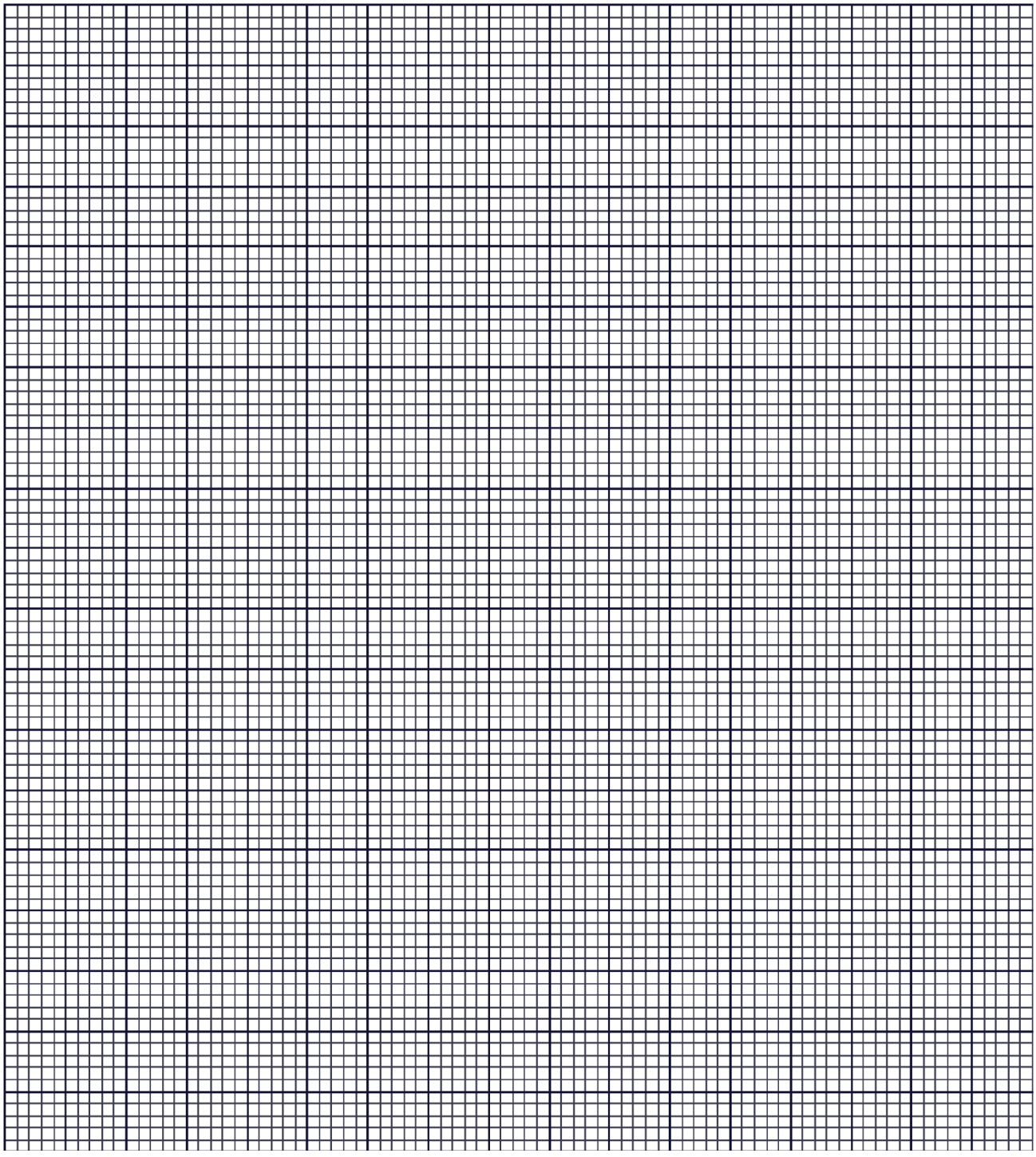
a) (i) His taxable income per month. (2mks)

(ii) Net tax. (5mks)

b) In addition, the following deductions were made NHIF sh 230, Service charge Ksh., Loan repayment Ksh 4000 and Co-operative shares of Ksh.1200

Calculate his net salary per month. (3mks)

18. a) Triangle XYZ has vertices X(2,-1), Y(4,-1) and Z(4,2). Triangle XYZ maps onto triangle $X^1Y^1Z^1$ under transformation $T_1 = \begin{pmatrix} 1 & -3 \\ 0 & 1 \end{pmatrix}$. Draw triangles XYZ and its image $X^1Y^1Z^1$ on the grid provided (4 mks)



b) Another triangle $X^{11}Y^{11}Z^{11}$ is the image of $X^{1}Y^{1}Z^{1}$ after transformation $T_2 = \begin{pmatrix} 0 & -2 \\ 2 & 0 \end{pmatrix}$.

b) Another triangle $X^{11}Y^{11}Z^{11}$is the image of $X^{1}Y^{1}Z^{1}$after transformation T_2=(0 − 2 2 0)

Draw triangle $X^{11}Y^{11}Z^{11}$ on the same set of axes. (2mks)

c) Find the single transformation matrix T that maps triangle XYZ on to the final image $X^{11}Y^{11}Z^{11}$. (2mks)

d) Given that the area of triangle XYZ is 15cm^2, find the area of triangle $X^{11}Y^{11}Z^{11}$.

(2mks)

19. The table below shows the distribution of the wages in a week for a number of employees in a certain factory.

Wage	800-899	900-999	1000-1099	1100-1199	1200-1399	1400-1599
Number of workers	3	10	23	9	3	2

a) Using Kshs. 1049.5 per week as the assumed mean wage,

Calculate the

(i) Mean for the group wages. (4mks)

b) Standard deviation. (5mks)

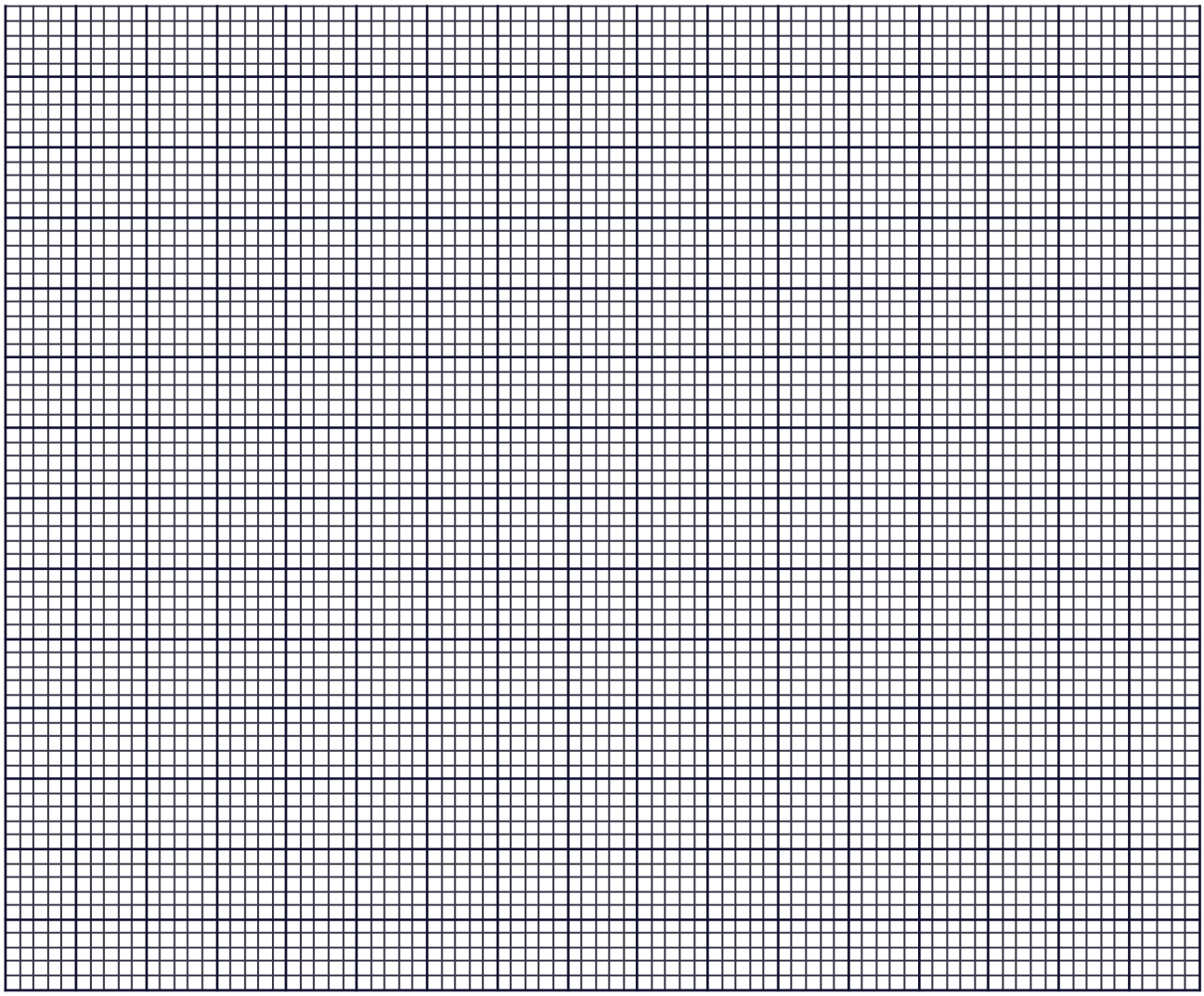
c) The week that followed, every employee earned extra Kshs. 100 as wage increment.

Determine the new mean for the group wage. (1mk)

20. A transporter wishes to transfer 1000 bags of sugar to a go-down. He has 2 types of Lorries to use, FTR with capacity of 80bags and a canter with capacity 20 bags. The canter has to make at most twice as many trips as the FTR makes. The total number of trips made by both Lorries must be less than 30, and the canter has to make more than 10 trips.

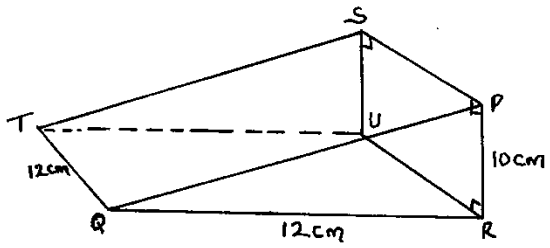
a) Write down all the possible inequalities to represent this information. Take trips made by FTR be x and trip made by canter be y. (4mks)

b) Represent the information above on the graph provided. (3mks)



C) If the FTR uses Ksh 1800 worth of fuel while the canter uses Ksh 1000 fuel per trip, estimate the maximum amount that can be spent on fueling the Lorries. (3mks)

21. The figure below shows a metallic wedge with QR = 12cm, QT=12cm and PR = 10cm. Plane PRUS is vertical to plane QRUT.



Calculate into 2 decimal places

(i) The length of the diagonal QS. (3mks)

(ii) The angle that QS makes with SR (4mks)

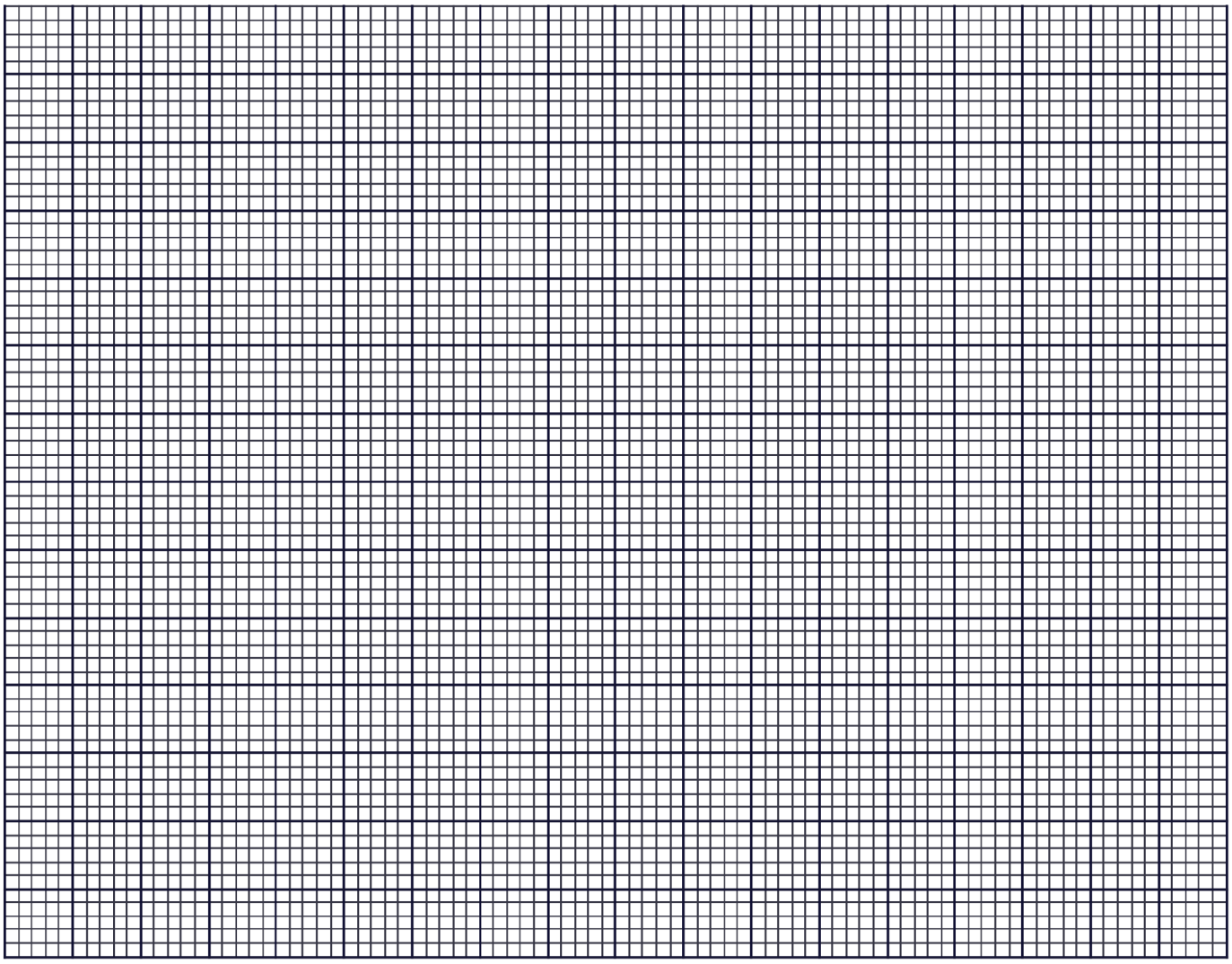
(iii) The mass in kgs of the wedge if the density of the metal is $15g/cm^3$. (3mks)

22. .Complete the table below for the function $y = X^3 + 6X^2 + 8X$
(2marks)

X	-5	-4	-3	-2	-1	0	1
X^3	-125	-64		-8	-1	0	1
$6X^2$		96	54		6	0	6
8X	-40		-24	-16		0	8
Y			3	0	-3	0	15

(a) **Draw** the graph of the function $y = x^3 + 6x^2 + 8x \ for \ -5 \leq \times \leq 1$ (3mks)

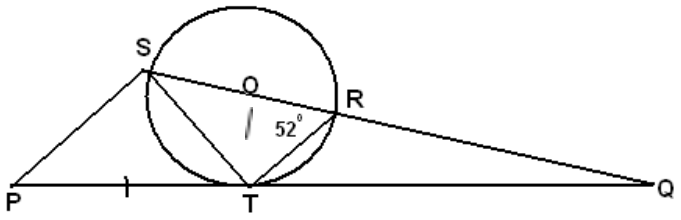
(Use a scale of 2cm to represent 1 unit on the x axis. 2cm to represent 5 units on the y-axis)



(ii) $x^3 + 5x^2 + 4x = -x^2 - 3x - 1$ (2mks)

(c) Find the values of x which will satisfy the inequality $x^3 + 6x^2 + 8x > 2$ (2mks)

23. In the figure below O is the centre of the circle and PTQ is the tangent at T. If PT =ST and angle SRT = 52^0, **determine** the size of the angles below giving reasons :



(a). PTS (2mks)

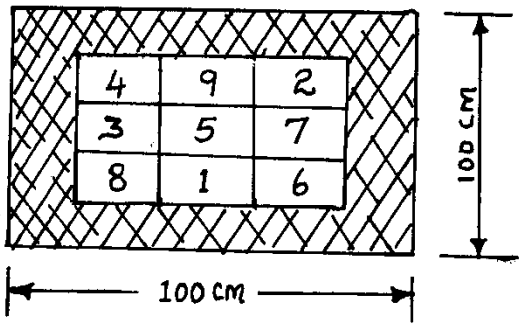
b) RTQ (2mks)

c) TSR (2mks)

d) TQR (2mks)

e) PSQ (2mks)

24. In a game at Kisumu show, darts are thrown at the board as illustrated in the figure below.



The outer square is of side 100cm and each of the nine 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) Show that the probability that, with one dart, the score will be 7 is 0.04. (2mks)

b) Find the probability that, with one dart, the score will be

(i) At least 7 (2mks)

(ii) 0 (2mks)

c) Each turn consists of throwing 3 darts. Calculate the probability of scoring

(i) Total of 18 with the first two darts. (2mks)

(ii) A total of 26 with the three darts. (2mks)