SECTION II (50 MARKS)

Answer any five questions in this section

17. Mr. Chesingei earned an annual basic salary of Kenya pounds 12360 when the rates of taxation were as in the table below.

Monthly income (pounds)	Rates (%)
1 – 484	10
485 – 940	15
941 – 1396	20
1397 – 1852	25
1853 and above	30

Apart from the basic salary, he is entitled to a house allowance of Kshs. 12,000 and medical allowance of Kshs. 6,000 per month.

(a) Calculate Chesingei's monthly taxable income in Kenya pounds. (3mks)

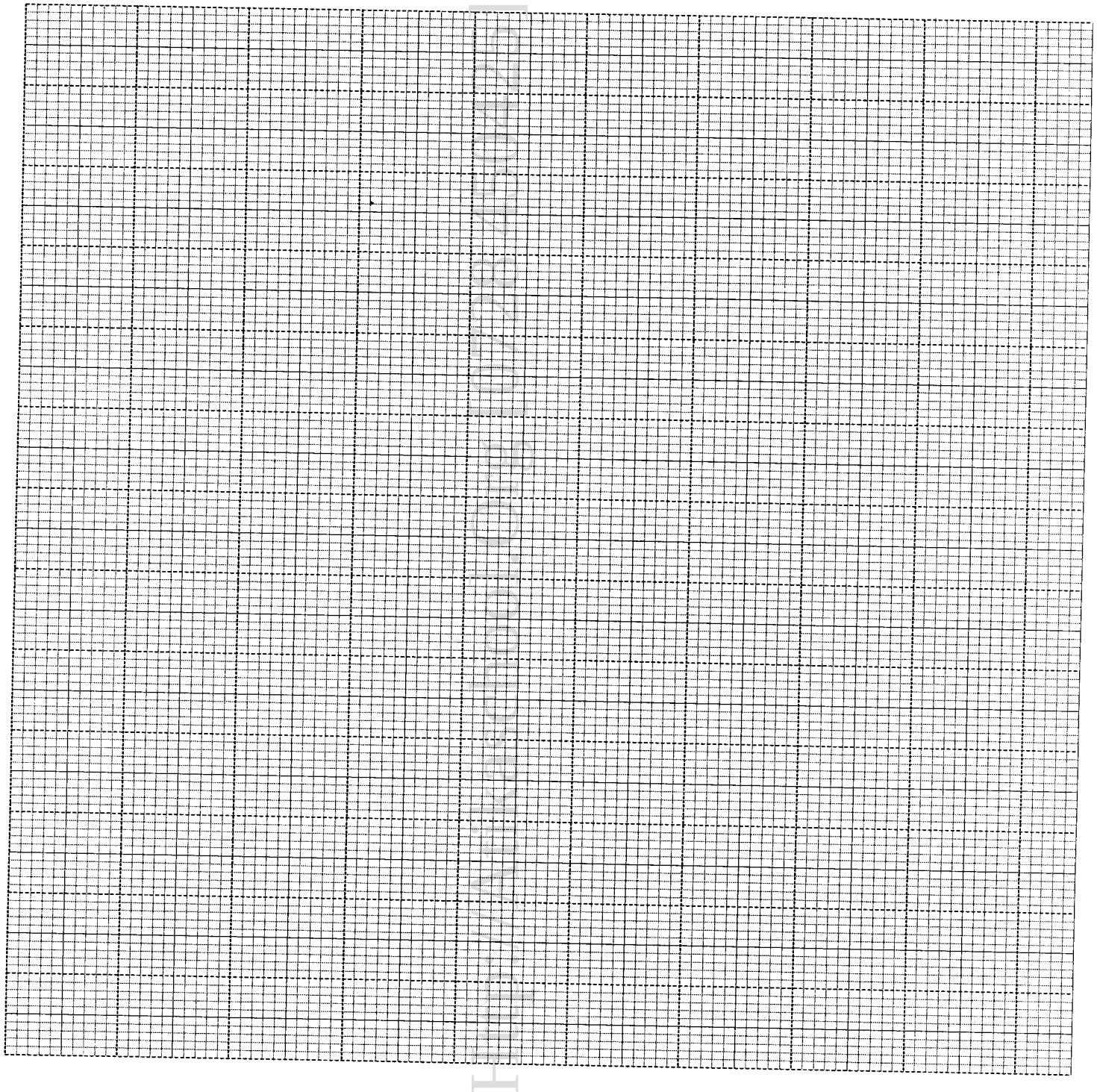
(b) Calculate Chesinge's monthly net income if he is given a tax relief of Ksh. 980 per month. Give your answer in Kenyan shillings. (5mks)

(c) How much more tax should he have paid per month in Kenya pounds if his monthly salary is increased by Ksh. 2500. (2mks)

18. The table below shows the distribution of marks scored by 100 candidates of Itierio Boys High school in an examination.

Marks	1– 10	11 – 20	21 – 30	31 – 40	41–50	51–60	61–70	71–80	81–90	91–100
No. of candidates	2	5	8	19	24	18	10	6	5	3

(a) Draw a cumulative frequency curve to illustrate the information above. (4mks)

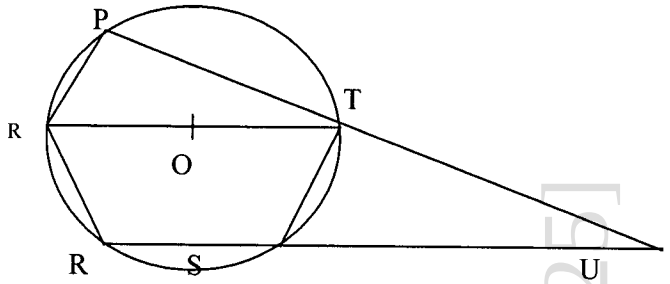


(b) Using your graph above determine:

(i) Semi Inter-quartile range (3mks)

(ii) Pass mark if 70% of the students passed. (3mks)

19. The figure below shows a circle centre O in which QOT is a diameter. <QTP = 46^0, TQR = 75^0 and SRT = 38^0, PTU and RSU are straight lines.



Calculate the following angles giving a reason in each case.

(a) <RST (2mks)

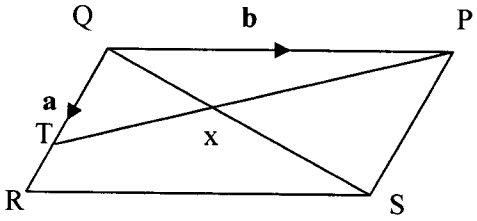
(b) <SUT (2mks)

(c) <PST (2mks)

(d) Obtuse <ROT (2mks)

(e) <SQT (2mks)

20. In the figure below, QT = **a** and QP = **b**.



If QR = 3**a** and RS = 2**b**,

(a) Express the vector PT in terms of **a** and **b**. (1mk)

(b) If PX = kPT, express QX in terms of **a, b** and k, where k is a scalar. (3mks)

(c) Write down an expression for QS in terms of **a** and **b**. (1mk)

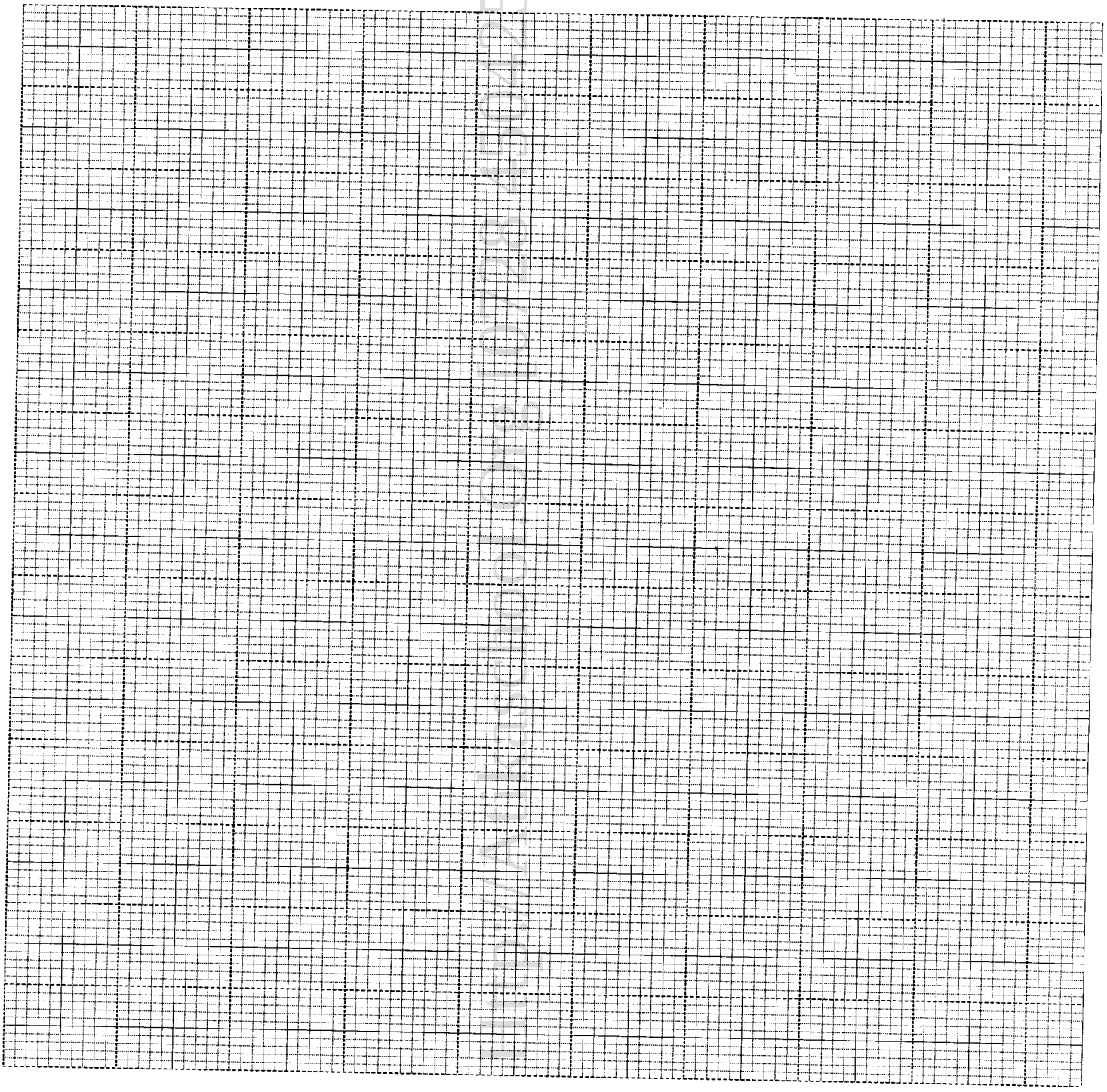
(d) If QX = t QS, use your result in (b) and (c) to find the value of k and t. (4mks)

(e) Find the ratio PX : XT. (1mk)

21. The law $E = KX^n$ gives an expression for the energy E joules stored in a spring for the extension xcm. The table below shows the value of E and the corresponding value of X.

xcm	2	2.5	3	3.5	4	5
E (joules)	108	169	243	330	432	675

Determine graphically the values of k and n. Write the equation connecting E and X. (10mks)



22. Three people Arthur, Mercy and Emmanuel are given an assignment. Arthur and Mercy take 6 days to complete the work. Arthur and Emmanuel take 6⅔ days to complete the same work while Mercy and Emmanuel take $8\frac{4}{7}$ days.

(a) Determine the time taken by
(i) Each working alone to complete the work. (5 mks)

(ii) All the three working together to complete the work (2 mks)

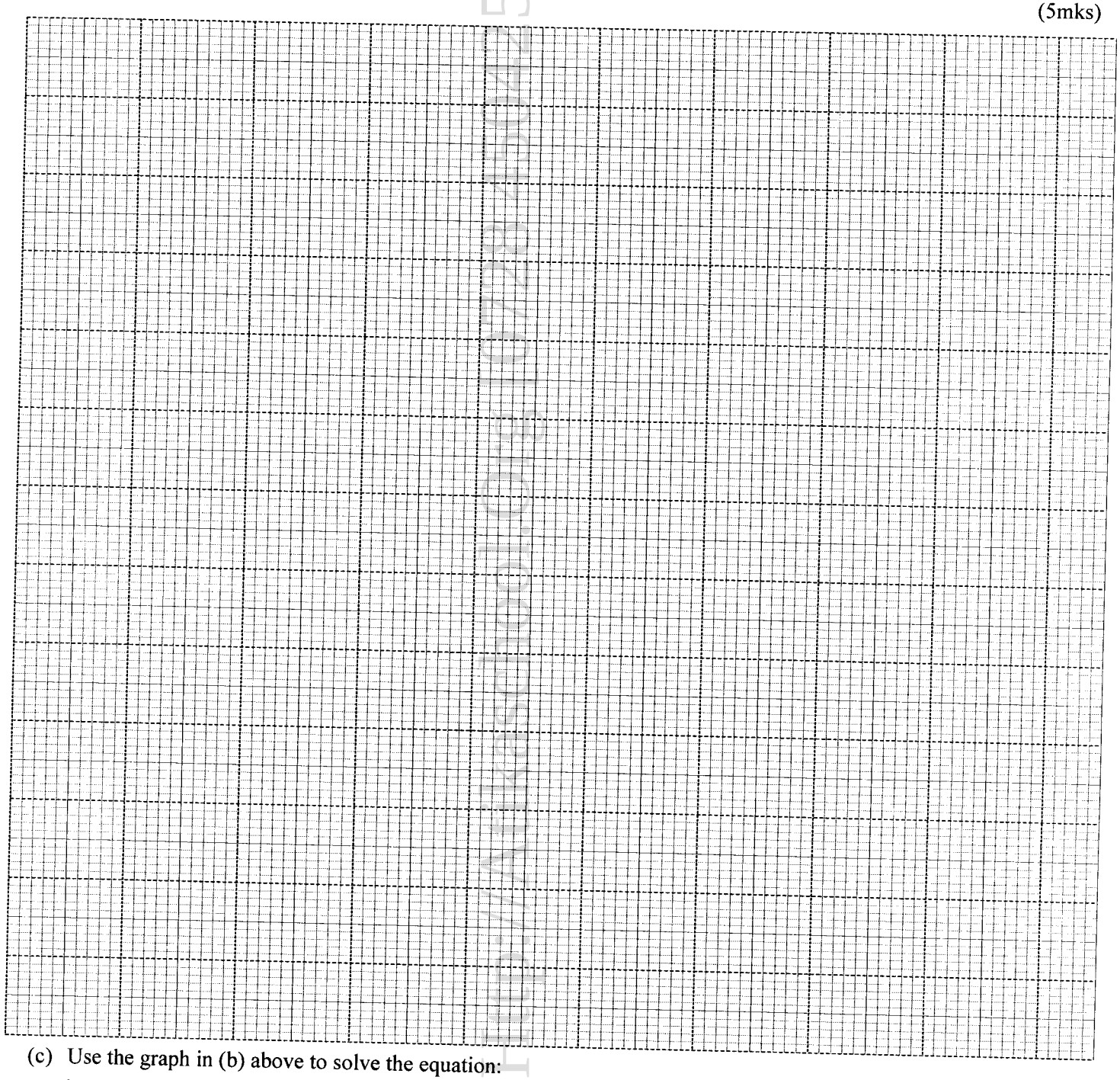
(b) Samuel works twice as fast as David. If the two take 8 days to do some work. Calculate the time David would take to complete the work if he was working alone . (3 mks)

23. (a) Fill the table below, giving the values correct to 2 decimal places. (3mks)

x^0	0	30	60	90	120	150	180	210	240	270	300	330	360
Sin2x													
3cosx-2													

(b) On the grid provided, draw the graphs of $y = \sin 2x$ and $y = 3\cos x - 2$ for $0^0 \leq x \leq 360^0$; on the same axes. Use the scale of 1cm to represent 30^0 on the x-axis and 2cm to represent 1 unit on the y-axis.

(5mks)

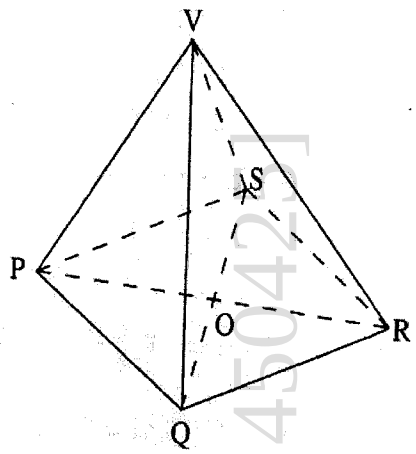


(c) Use the graph in (b) above to solve the equation:

$3 \cos x - \sin 2x = 2$

(2 mks)

24. The figure below represents a right pyramid on a square base PQRS of side 12 cm. O is the centre of the base and VO = 14 cm.



Calculate;

(a) The length of VP to 1 decimal place (3 mks)

(b) The angle which VP makes with the base PQRS (2 mks)

(c) The surface area of the pyramid to 1 decimal place (3 mks)

(d) The volume of the pyramid (2 mks)