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M. M. HR. SEC. SCHOOL, THIRUNAGAR, MADURAI

TENTH PUBLIC EXAM - 2025 - ANSWER KEY

PART-III MATHEMATICS Marks: 100

PART-I:

1. ஆ) {4, 9, 25, 49, 121}

2. அ) n^m.

3. ஆ) $0 \leq r < b$

4. அ) 0

5. அ) 5

6. ஈ.) நிலை எண்

7. அ) தொடு மண்ணி

8. ஆ) $3x+7y=0$

9. அ) 1.

10. ஈ.) 60°

11. ஈ.) 136 π ச.அலகு

12. அ) $\frac{4}{3}\pi$

13. அ) $P(A) > 1$

14. ஈ.) 4/5

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PART-II

15. $A = \{1, 2, 3\}$ $B = \{2, 3, 5, 7\}$

$A \times B = \{(1,2), (1,3), (1,5), (1,7), (2,2), (2,3), (2,5), (2,7), (3,2)$
$(3,3), (3,5), (3,7)\}$

16. $f(x) = 2x+1$, $g(x) = x^2-2$

$fog = f(g(x)) = f(x^2-2) = 2(x^2-2)+1 = 2x^2-4+1 = 2x^2-3$

$gof = g(f(x)) = g(2x+1) = (2x+1)^2-2 = 4x^2+1+4x-2 = 4x^2+4x-1$

17. 25 வரிசைகள் முழுமை பெறும். 7 மீதமுள்ள நாற்காலிகள்.

$(532 = 21 \times 25 + 7)$

18. $\frac{x^3-y^3}{x-y} = \frac{(x-y)(x^2+xy+y^2)}{x-y} = x^2+xy+y^2.$

19. $A = \begin{pmatrix} 2 & 1 \\ 1 & 3 \end{pmatrix}$, $B = \begin{pmatrix} 2 & 0 \\ 1 & 3 \end{pmatrix}$

$AB = \begin{pmatrix} 5 & 3 \\ 5 & 9 \end{pmatrix}$ $BA = \begin{pmatrix} 4 & 2 \\ 5 & 10 \end{pmatrix}$ $AB \neq BA.$

20. கோண இருசமவெட்டி தேற்றத்தின்படி

$\frac{BD}{CD} = \frac{AB}{AC}$

$\frac{4}{3} = \frac{6}{AC}$

$AC = 4.5cm.$

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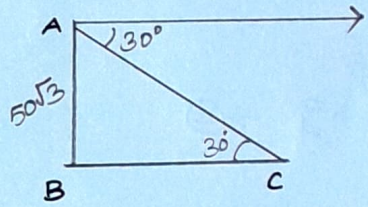
21. $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-1}{2} \Rightarrow \frac{3-a}{9+1} = \frac{-1}{2} \Rightarrow 6 - 2a = -11 \Rightarrow a = 17/2.$

22. சாய்வு $m = \frac{-x\text{-ன் கெழு}}{y\text{-ன் கெழு}}$ $m_1 = 1/2$ $m_2 = -2$

$\perp^{lar}$ $m_1 \times m_2 = 1/2 \times -2 = -1$. கொடுக்கப்பட்ட கோடுகள் செங்குத்தானவை.

23.



$\tan 30^\circ = \frac{50\sqrt{3}}{x} \Rightarrow x = 50 \times 3 = 150\,m.$

24. $4\pi r_1^3 : 4\pi r_2^3 \Rightarrow (4)^3 : (7)^3 \Rightarrow 64 : 343.$

25. $l = 5cm$, $R = 4cm$, $r = 1cm$

இடைக்கண்டத்தின் வளைபரப்பைத் $= \pi(R+r)l = \frac{22}{7}(4+1)5 = 78.57cm^2$

26. $L = 28$, $S = 18$ ஆழம் $= L - S = 28 - 18 = 10.$

27. $n(S) = 200$, $n(A) = 80$. $P(A) = \frac{n(A)}{n(S)} = \frac{80}{200} = \frac{2}{5}$

28. $\sqrt{2}, \sqrt{8}, \sqrt{18}, \sqrt{32}, \sqrt{50}, \ldots$

$d = t_2 - t_1 = \sqrt{8} - \sqrt{2} = 2\sqrt{2} - \sqrt{2} = \sqrt{2}$

$d = t_3 - t_2 = \sqrt{18} - \sqrt{8} = 3\sqrt{2} - 2\sqrt{2} = \sqrt{2}$

$t_2 - t_1 = t_3 - t_2$

எனவே இது ஒரு கூட்டுத்தொடர் வரிசை

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PART-III.

28. $A = \{1, 2, 3, 4, 5, 6, 7\}$, $B = \{2, 3, 5, 7\}$, $C = \{2\}$

$A \cap B = \{2, 3, 5, 7\}$, $(A \cap B) \times C = \{(2,2), (3,2), (5,2), (7,2)\} \rightarrow (1)$

$A \times C = \{(1,2), (1,3), (1,5), (1,7), (2,2), (2,3), (2,5), (2,7), (3,2), (3,3), (3,5), (3,7), (4,2), (4,3), (4,5), (4,7), (5,2), (5,3), (5,5), (5,7), (6,2), (6,3), (6,5), (6,7), (7,2), (7,3), (7,5), (7,7)\}$

$B \times C = \{(2,2), (3,2), (5,2), (7,2)\}$

$(A \times C) \cap (B \times C) = \{(2,2), (3,2), (5,2), (7,2)\} \rightarrow (2)$

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29. $A = \{2, 4, 6, 10, 12\}$ $B = \{0, 1, 2, 4, 5, 9\}$

$f(x) = \frac{x}{2} - 1$ $f(2) = 0$, $f(4) = 1$, $f(6) = 2$, $f(10) = \cancel{5}\ 4$

$f(12) = 5$

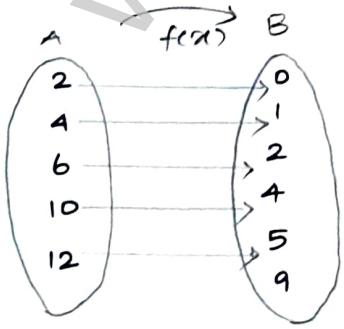
(i) வரிசைச் சோடிகளின் கணம்:

$\{(2,0), (4,1), (6,2), (10,4), (12,5)\}$

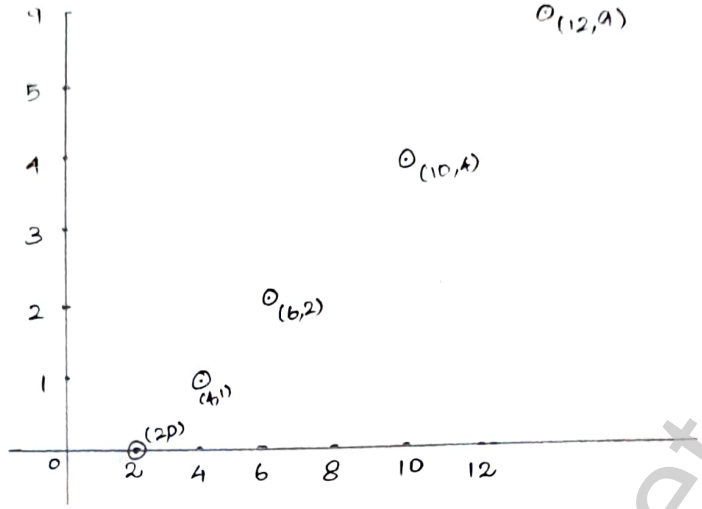
(ii) அட்டவணை:

2	4	6	10	12
0	1	2	4	5

(iii) அம்புக்குறி படம்:



(iv) வரைபடம்:



31. $113400 = (2)^3 \times (3)^4 \times (5)^2 \times (7)^1$

$P_1 = 2$, $P_2 = 3$, $P_3 = 5$, $P_4 = 7$

$x_1 = 3$, $x_2 = 4$, $x_3 = 2$, $x_4 = 1$

32 $1^2 + 2^2 + 3^2 + \dots + n^2 = \frac{n(n+1)(2n+1)}{6}$

$6^2 + 7^2 + 8^2 + \dots + 21^2 = (1^2 + 2^2 + \dots + 21^2) - (1^2 + 2^2 + \dots + 5^2)$

$= \frac{21 \times 22 \times 43}{6} - \frac{5 \times 6 \times 11}{6}$

$= 3311 - 55 = 3256.$

33. $A = \begin{pmatrix} 1 & 2 & 1 \\ 2 & -1 & 1 \end{pmatrix}$ $B = \begin{pmatrix} 2 & -1 \\ -1 & 4 \\ 0 & 2 \end{pmatrix}$

$AB = \begin{pmatrix} 0 & 9 \\ 5 & -4 \end{pmatrix} \Rightarrow (AB)^T = \begin{pmatrix} 0 & 5 \\ 9 & -4 \end{pmatrix} \rightarrow (1)$

$B^T = \begin{pmatrix} 2 & -1 & 0 \\ -1 & 4 & 2 \end{pmatrix}$ $A^T = \begin{pmatrix} 1 & 2 \\ 2 & -1 \\ 1 & 1 \end{pmatrix}$

$B^T A^T = \begin{pmatrix} 0 & 5 \\ 9 & -4 \end{pmatrix} \rightarrow (2)$

$(1) = (2)$ $(AB)^T = B^T A^T$

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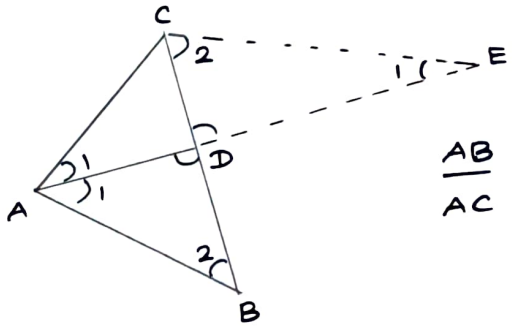
34. கோண இருசமவெட்டி தேற்றம்:

ஒரு முக்கோணத்தின் ஒரு கோணத்தின் உட்புற இருசமவெட்டியானது அக்கோணத்தின் எதிர் பக்கத்தை உட்புறமாக அக்கோணத்தினை அடக்கிய பக்கங்களின் விகிதத்தில் பிரிக்கும்.



$$\frac{AB}{AC} = \frac{BD}{CD}$$

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35 நாற்கரத்தின் பரப்பு $= \frac{1}{2}\begin{vmatrix} x_1 & x_2 & x_3 & x_4 & x_1 \\ y_1 & y_2 & y_3 & y_4 & y_1 \end{vmatrix} \Rightarrow 21 - 7k = 56$

$\Rightarrow k = -5$

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36. $a + b = 7 \Rightarrow b = 7 - a$

$\frac{x}{a} + \frac{y}{7-a} = 1 \Rightarrow a^2 + 4a - 21 = 0$

$a = 3, \; b = 4$

$\frac{x}{3} + \frac{y}{4} = 1 \Rightarrow 4x + 3y - 12 = 0.$

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37. $\frac{\sin^3 A + \cos^3 A}{\sin A + \cos A} + \frac{\sin^3 A - \cos^3 A}{\sin A - \cos A} = \frac{(\sin A + \cos A)(\sin^2 A + \cos^2 A - \sin A \cos A)}{(\sin A + \cos A)}$

$= 1 - \sin A \cos A + 1 + \sin A \cos A$

$= 1 + 1 = 2.$

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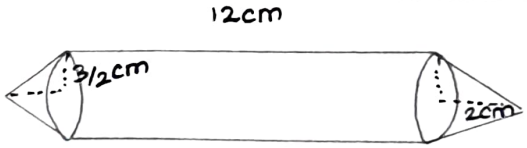
38.



கூம்பு : $h = 2cm$ $r = 3/2\ cm$

உருளை : $h = 12 - 2 - 2 = 8\ cm$

$d = 3\ cm$ $r = 3/2\ cm$

உருளையின் கன அளவு $= \pi r^2 h$ க.அ $= 56.57\ cm^3$.

கூம்பின் கன அளவு $= 2 \times \frac{1}{3} \pi r^2 h = 9.42\ cm^3$.

மொத்த கன அளவு $= 65.99 = 66\ cm^3$.

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39 $R = 16\ cm$ $r = 2\ cm$

$$n\left(\frac{4}{3}\pi r^3\right) = \frac{4}{3}\pi R^3 \Rightarrow n\left(\frac{4}{3}\pi (2)^3\right) = \frac{4}{3}\pi \times 16^3$$

$$\Rightarrow 8n = 4096 \Rightarrow n = 512.$$

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40. சீயா

$\Sigma x_1 = 460$

$\sigma_1 = 4.6$

$\bar{x}_1 = \frac{\Sigma x_1}{n} = \frac{460}{5} = 92$

$C.V_1 = \frac{\sigma_1}{\bar{x}_1} \times 100\% = \frac{4.6}{92} \times 100\%$

$C.V_1 = 5\%$

மீசீயா:

$\Sigma x_2 = 480$

$\sigma_2 = 2.4$

$\bar{x}_2 = \frac{\Sigma x_2}{n} = \frac{480}{5} = 96$

$C.V_2 = \frac{\sigma_2}{\bar{x}_2} \times 100\% = \frac{2.4}{96} \times 100\%$

$C.V_2 = 2.5\%$

மீசீயா செயல்திறன் மிகுந்த நிலைத்தன்மை கொண்டது.

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41. $n(S) = 26$

(i) $P(A) = \frac{n(A)}{n(S)} = \frac{6}{26} = \frac{3}{13}$

(ii) $P(B) = \frac{8+5}{26} = \frac{13}{26} = \frac{1}{2}$

(iii) $P(C) = \frac{5+7+8}{26} = \frac{20}{26} = \frac{10}{13}$

(iv) $P(D) = \frac{5+7}{26} = \frac{12}{26} = 6/13$

42. $(x-1)^2 + (x-2)^2 + (x-3)^2 = 0$

$(x-1)^2 + (x-2)^2 + (x-3)^2 = x^2 - 2x + 1 + x^2 - 4x + 4 + x^2 - 6x + 9$

$= 3x^2 - 12x + 14$

$3x^2 - 12x + 14 = 0$

$a = 3, \quad b = -12 \quad c = 14$

$\Delta = b^2 - 4ac$

$= (12)^2 - 4(3)(14)$

$= 144 - 168$

$= -24$

$\Delta < 0$

எனவே மெய் மூலங்கள் இல்லை.

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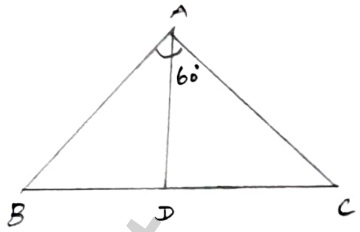
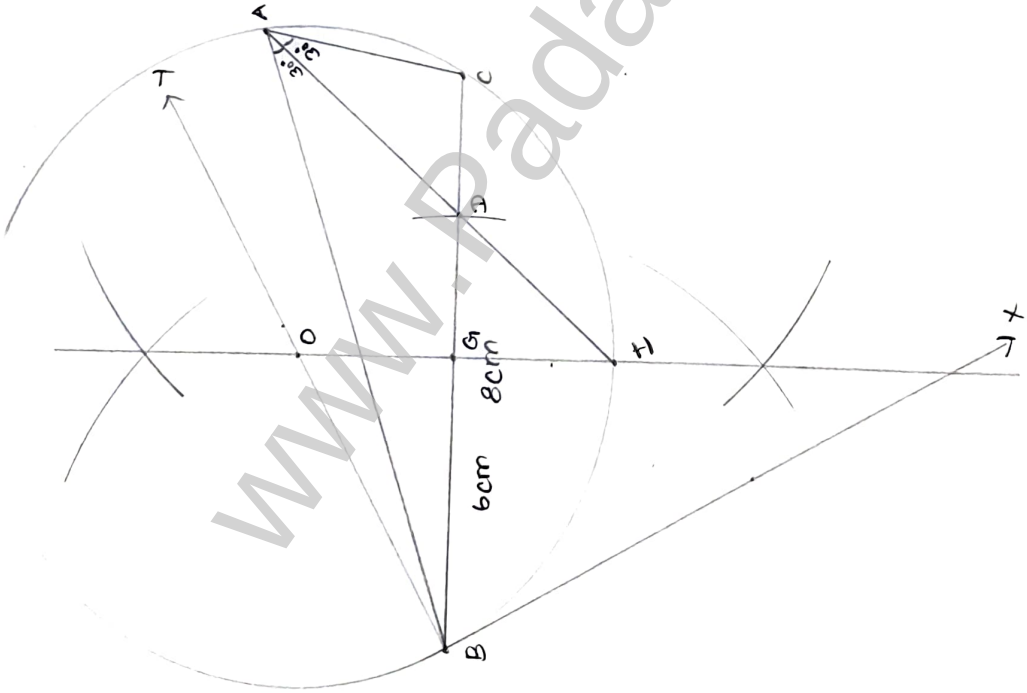
PART-IV

43. $BC = 8cm$, $\angle A = 60^\circ$, $BD = 6cm$.

a)





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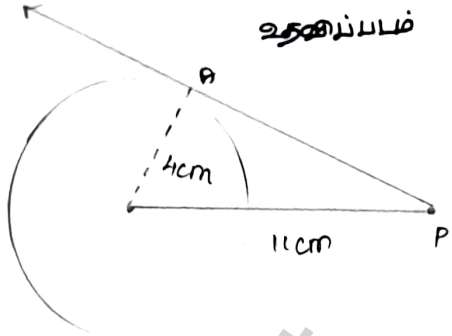
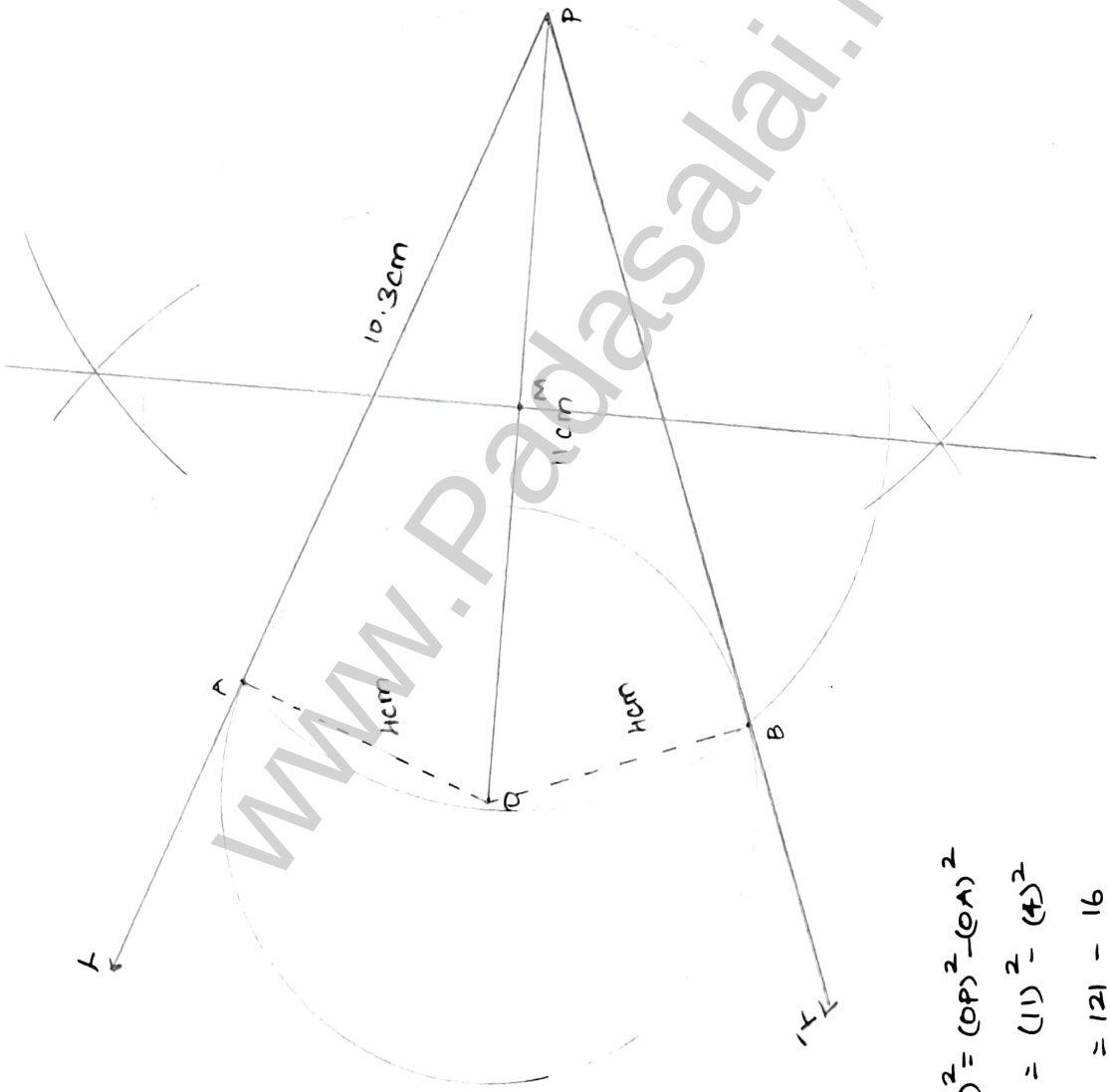
b)

radius = 4cm 11cm away from centre.





$(AP)^2 = (OP)^2 - (OA)^2$

$= (11)^2 - (4)^2$

$= 121 - 16$

$AP = 10.3cm.$

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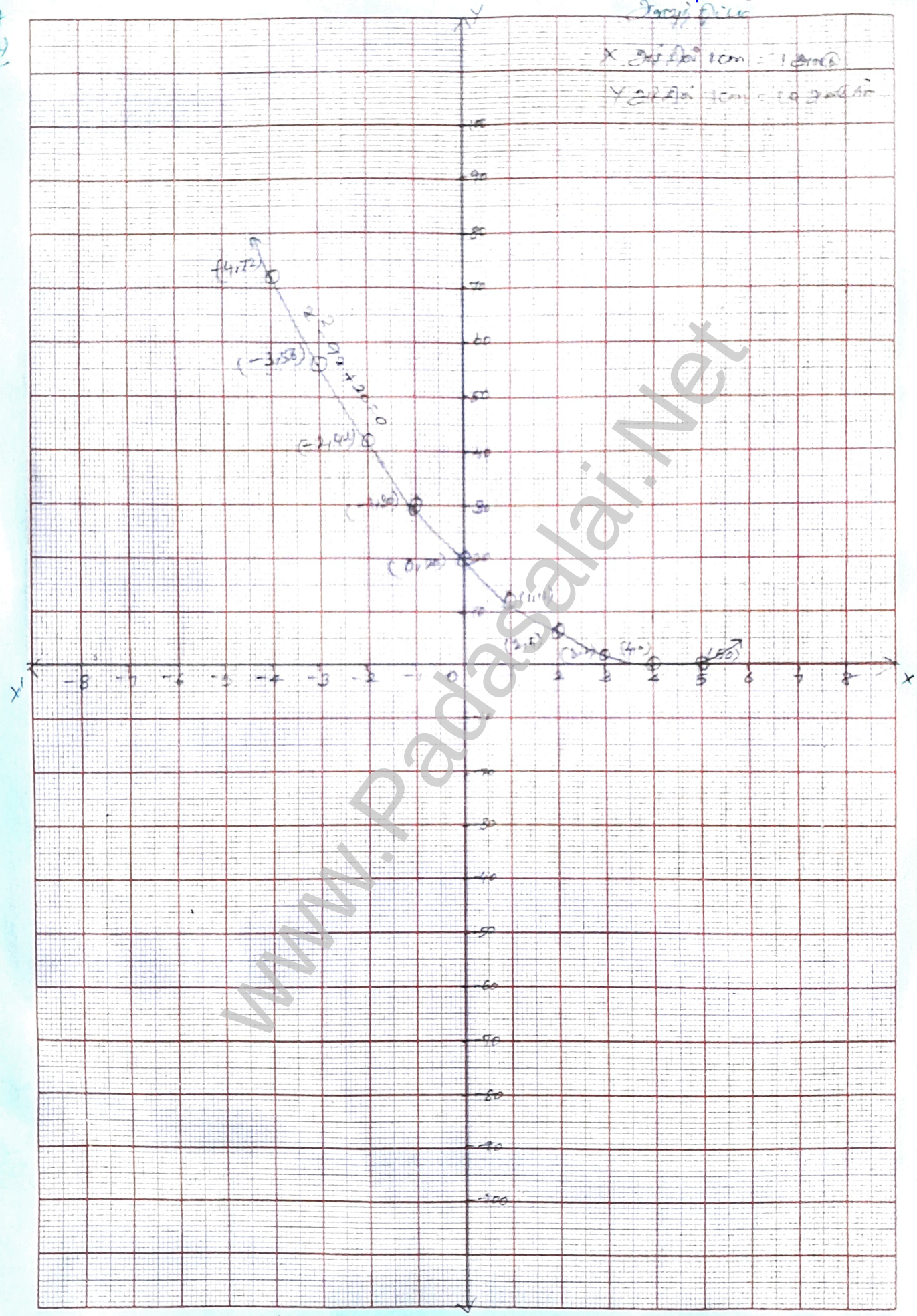
44
(a)



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44)

a)

(-4, 72) (-3, 56) (-2, 42), (-1, 30) (0, 20) (1, 12) (2, 6)

(3, 2) (4, 0) (5, 0)

தீர்வு (4, 0) (5, 0) {4, 5}

மெய் மற்றும் சமமற்ற மூலங்கள்

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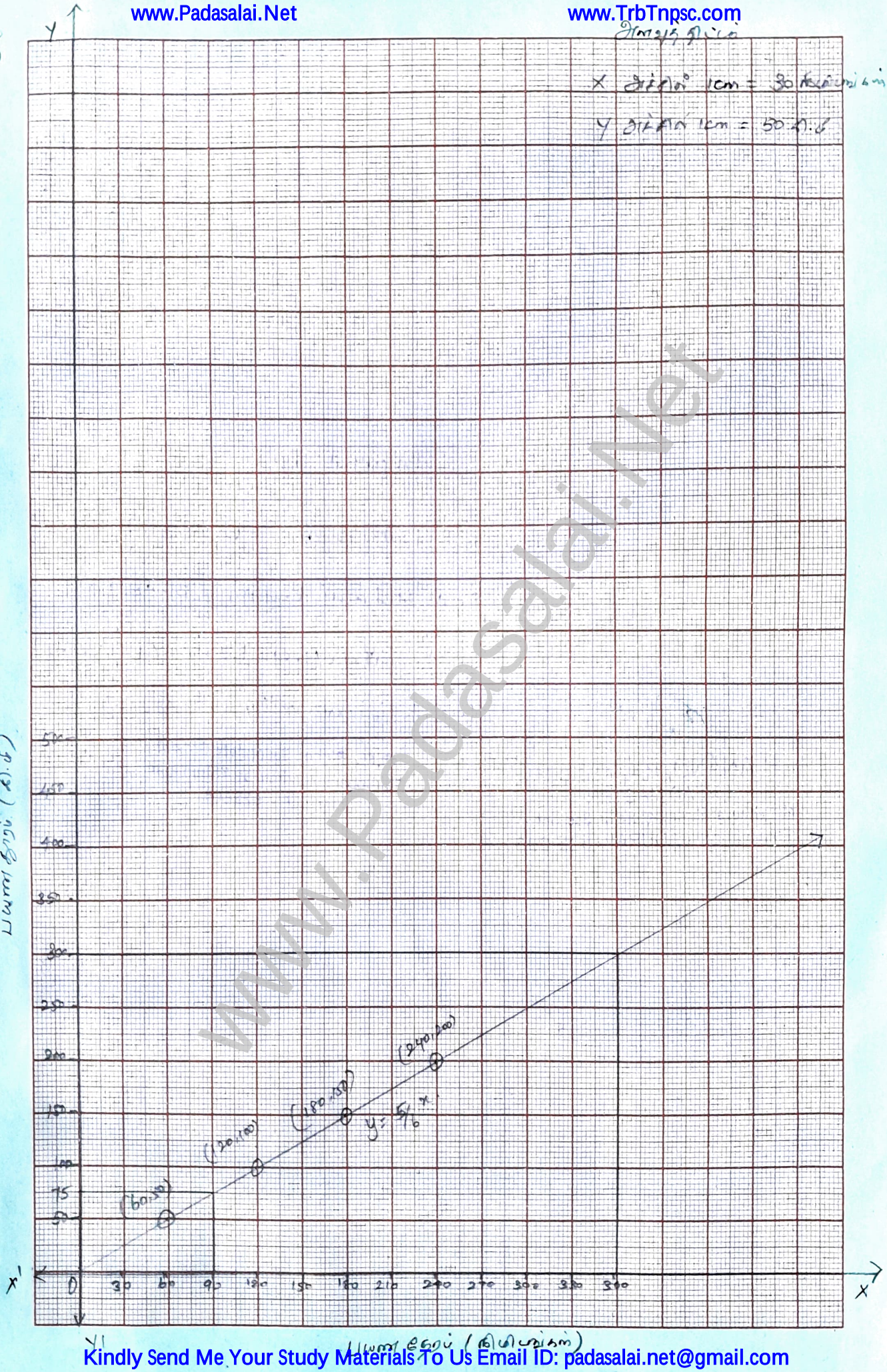
44 b)



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x	60	120	180	240
y	50	100	150	200

$x \uparrow$ $y \uparrow$ நேர்மாறாகும்.

$k = 5/6$

(i) (90, 75)

(ii) (360, 300)

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