Y. SEENIVASAN. M.Sc. B.Ed
Maths Teacher,
8489880553

10^{th} Maths Public Exam – 2025
March – Answer Key

Part – I

1. c) $\{4, 9, 25, 49, 121\}$
2. a) m^n from A to B $= n^m$, B to A $= m^n$.
3. c) $0 \le r < b$.
4. a) 0
5. b) 5
6. d) row matrix.
7. b) Point of Contact.
8. d) $7x - 3y = 0$ $7x-3y+4=0$ $m_1 = \frac{-a}{b}$ $m_1 = \frac{7}{3}$ $(0,0)$ $\parallel$ - Parallel $y - 0 = \frac{7}{3}(x-0)$.
9. b) 1
10. d) 60°
11. d) $136\pi\ cm^2$
12. a) $\frac{4}{3}\pi$
13. a) $P(A) > 1$
14. d) $\frac{4}{5}$

Part – II

15: Soln

$A = \{1, 2, 3\}$

$B = \{2, 3, 5, 7\}$

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

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

16. Soln

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

$f \circ g = f(g(x)) = f(x^2-2) = 2(x^2-2)+1$

$= 2x^2 - 3$

$g \circ f = g(f(x)) = g(2x+1) = (2x+1)^2 - 2$

$= 4x^2 + 4x + 1 - 2$

$= 4x^2 + 4x - 1$ $f \circ g \ne g \circ f$.

17. Soln: A man 532 flower pots. Each row 21 pots.

$a = bq + r$.

$532 = 21q + r$.

$$\begin{array}{r|l} 21 & 532 \\ & \underline{42} \\ & 112 \\ & \underline{105} \\ & 7 \end{array} \quad q = 25$$

$532 = 21 \times 25 + 7$

No. of Completed rows $= 25$.

No. of flower pots left $= 7$.

18). Soln

$$\frac{x^3}{x-y} + \frac{y^3}{y-x} = \frac{x^3}{x-y} - \frac{y^3}{x-y}$$

$$= \frac{\cancel{(x-y)}(x^2+xy+y^2)}{\cancel{(x-y)}}$$

$$= x^2 + xy + y^2$$

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

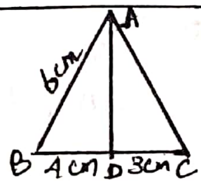
$$AB = \begin{pmatrix} 2 & 1 \\ 1 & 3 \end{pmatrix}\begin{pmatrix} 2 & 0 \\ 1 & 3 \end{pmatrix} = \begin{pmatrix} 4+1 & 0+3 \\ 2+3 & 0+9 \end{pmatrix}$$

$$= \begin{pmatrix} 5 & 3 \\ 5 & 9 \end{pmatrix}$$

$$BA = \begin{pmatrix} 2 & 0 \\ 1 & 3 \end{pmatrix}\begin{pmatrix} 2 & 1 \\ 1 & 3 \end{pmatrix} = \begin{pmatrix} 4+0 & 2+0 \\ 2+3 & 1+9 \end{pmatrix}$$

$$= \begin{pmatrix} 4 & 2 \\ 5 & 10 \end{pmatrix} \quad AB \ne BA$$

20. Soln



By ABT $\frac{AB}{AC} = \frac{BD}{DC}$

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

$AC = \frac{\cancel{6}^{3} \times 3}{\cancel{4}_{2}} = \frac{9}{2} = 4.5$

$AC = 4.5$ cm.

21) Soln: Points $(-2, a)$ & $(9, 3)$ (x_1, y_1) (x_2, y_2)

Slope $= -\frac{1}{2}$

(1)

slope $= \dfrac{y_2 - y_1}{x_2 - x_1} \Rightarrow -\dfrac{1}{2} = \dfrac{3-a}{9+2}$

$-\dfrac{1}{2} = \dfrac{3-a}{11} \Rightarrow -11 = 2(3-a)$

$6 - 2a = -11 \Rightarrow 2a = 17 \quad \boxed{a = \dfrac{17}{2}}$

22. Soln Eqn: $x - 2y + 3 = 0 \quad a=1 \; b=-2$

$6x + 3y + 8 = 0 \quad a=6 \; b=3$

$m_1 = -\dfrac{a}{b} = \dfrac{+1}{+2}$

$\boxed{m_1 = \dfrac{1}{2}}$

$m_2 = -\dfrac{a}{b} = -\dfrac{\cancel{6}^{\,2}}{\cancel{3}}$

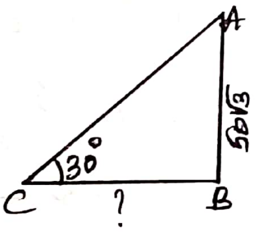
$\boxed{m_2 = -2}$

$\perp r \quad m_1 \times m_2 = -1 \Rightarrow \dfrac{1}{\cancel{2}} \times -\cancel{2} = -1.$

23. Soln

$\tan\theta = \dfrac{OS}{AS}$

$\tan 30^\circ = \dfrac{AB}{BC}$



$\dfrac{1}{\sqrt{3}} = \dfrac{50\sqrt{3}}{BC} \Rightarrow BC = 50\sqrt{3} \times \sqrt{3}$

$= 50 \times 3$

$\boxed{BC = 150 \text{ m}}$

24). Soln: ratio of radii $= 4:7$

vol. of ratio $= \dfrac{\frac{4}{3}\pi r_1^3}{\frac{4}{3}\pi r_2^3} = \left(\dfrac{4}{7}\right)^3$

$v_1 : v_2 = 64 : 343$

25). Soln $l = 5$ cm $\quad R = 4$ cm $\quad r = 1$ cm.

C.S.A of frustum $= \pi(R+r)\,l$ sq.units.

$= \dfrac{22}{7} \times (4+1) \times 5$

$= \dfrac{550}{7}$

C.S.A. $= 78.57 \text{ cm}^2$

26). Soln $L = 28. \quad S = 18.$

Range $R = L - S$

$R = 28 - 18$

$R = 10$ years.

27. Soln No. flowers $n(S) = 80 + 70 + 50$

$n(S) = 200$

No. of yellow flower $n(Y) = 80$

$P(Y) = \dfrac{n(Y)}{n(S)} = \dfrac{\cancel{80}^{\,2}}{\cancel{200}_{\,5}}$

$\boxed{P(Y) = \dfrac{2}{5}}$

28). Soln $\sqrt{2}, \sqrt{8}, \sqrt{18}, \ldots$

A.P condition $\quad 2b = a + c$

$2 \times \sqrt{8} = \sqrt{2} + \sqrt{18}$

$2 \times 2\sqrt{2} = \sqrt{2} + 3\sqrt{2}$

$4\sqrt{2} = 4\sqrt{2} \quad \therefore$ Sequence A.P.

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

$= 2\sqrt{2} - \sqrt{2}$

$\boxed{d = \sqrt{2}}.$

Part-III

29. Soln: $A = \{1,2,3,4,5,6,7,8\}$

$B = \{2,3,5,7\} \quad C = \{2\}$

LHS

$A \cap B = \{1,2,3,4,5,6,7,8\} \cap \{2,3,5,7\}$

$= \{2,3,5,7\}$

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

$= \{(2,2),(3,2),(5,2),(7,2)\}$ — (1)

RHS

$A \times C = \{(1,2),(2,2),(3,2),(4,2),(5,2),(6,2),(7,2),(8,2)\}.$

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

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

$(A \cap B) \times C = (A \times C) \cap (B \times C).$

③

30. Soln: $f(2) = \frac{2}{2} - 1 = 0$.

$f(4) = \frac{4}{2} - 1 = 1$, $f(6) = \frac{6}{2} - 1 = 2$

$f(10) = \frac{10}{2} - 1 = 4$, $f(12) = \frac{12}{2} - 1 = 5$.

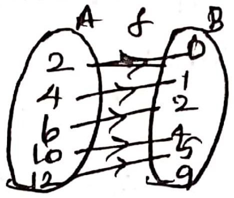
(i) Set of ordered Pairs:

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

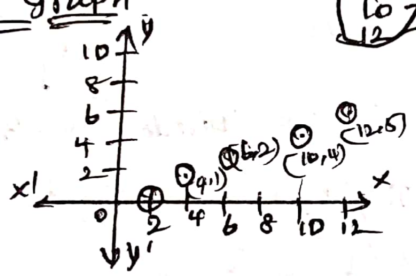
(ii) A table:

x	2	4	6	10	12
$f(x)$	0	1	2	4	5

(iii) An arrow diagram.



(iv) A graph



31. Soln

$p_1^{x_1} \times p_2^{x_2} \times p_3^{x_3} \times p_4^{x_4} = 113400$

$2^3 \times 3^4 \times 5^2 \times 7^1 = 113400$

$p_1 = 2,\ p_2 = 3,\ p_3 = 5,\ p_4 = 7.$

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

2	113400
2	56700
2	28350
3	14175
3	4725
3	1575
3	525
5	175
5	35
	7

32). Soln: $6^2 + 7^2 + 8^2 + \dots + 21^2$.

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

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

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

$= 77 \times 43 - 55$

$= 3311 - 55$

$= 3256$.

$$\begin{array}{r} 43 \\ \times 77 \\ \hline 301 \\ 301 \\ \hline 3311 \end{array}$$

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

LHS

$AB = \begin{pmatrix} 1 & 2 & 1 \\ 2 & -1 & 1 \end{pmatrix} \begin{pmatrix} 2 & -1 \\ -1 & 4 \\ 0 & 2 \end{pmatrix}$

$= \begin{pmatrix} 2-2 & -1+8+2 \\ 4+1 & -2-4+2 \end{pmatrix} = \begin{pmatrix} 0 & 9 \\ 5 & -4 \end{pmatrix}$

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

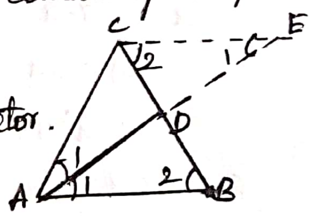
RHS

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

$B^T A^T = \begin{pmatrix} 2-2 & 4+1 \\ -1+8+2 & -2-4+2 \end{pmatrix}$

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

34). ABT: The internal bisector of an angle of triangle divides the opposite side internally in the ratio of the corresponding sides containing the angle



Proof In ΔABC. AD is the internal bisector.

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

Construction Draw a line $C \parallel AB$. Extend AD to meet C at E.

Statement	Reason.
$\angle AEC = \angle BAE = \angle 1$ $\angle ABD = \angle ECD = \angle 2$	Alternate angles equal.
ΔACE isosceles. $AC = CE$	In ΔACE $\angle CAE = \angle CEA$.
$\Delta ABD \sim \Delta ECD$ $\frac{AB}{CE} = \frac{BD}{CD}$	By AA similarity
$\frac{AB}{AC} = \frac{BD}{CD}$	$AC = CE$. Hence proved.

35. Soln $(-4,-2)\ (-3,k)\ (3,-2)\ (2,3)$

Area of Quadrilateral $= \frac{1}{2}\begin{vmatrix} x_1 & x_2 & x_3 & x_4 & x_1 \\ y_1 & y_2 & y_3 & y_4 & y_1 \end{vmatrix}$ sq. units

$$\frac{1}{2}\begin{vmatrix} -4 & -3 & 3 & 2 & -4 \\ -2 & k & -2 & 3 & -2 \end{vmatrix} = 28$$

$$\left\{ (-4k+6+9-4) - (6+3k-4-12) \right\} = 56$$

$$\left\{ (-4k+11) - (3k-10) \right\} = 56$$

$$-7k+21 = 54 \Rightarrow -7k = 56-21$$

$$k = \frac{\cancel{35}^{5}}{\cancel{-7}} \quad \boxed{k=-5}$$

36). Soln $a+b=7 \quad b=7-a.$

Intercept form $\frac{x}{a}+\frac{y}{b}=1$

$\frac{x}{a}+\frac{y}{7-a}=1$ Point $(\overset{x}{-3},\overset{y}{8})$

$$\frac{-3}{a}+\frac{8}{7-a}=1 \Rightarrow -3(7-a)+8 = a(7-a)$$

$$-21+3a+8a = 7a-a^2$$

$$a^2+4a-21=0 \qquad {}^{-21}_{+7\ -3}$$

$$(a+7)(a-3)=0.$$

$\boxed{a=3}$ (or) $a=-7$

a +ve. $b = 7-3 = 4.$

$$\frac{x}{3}+\frac{y}{4}=1$$

$$4x+3y=12 \Rightarrow \boxed{4x+3y-12=0}$$

37. Soln

$$a^3+b^3 = (a+b)(a^2-ab+b^2)$$

$$a^3-b^3 = (a-b)(a^2+ab+b^2)$$

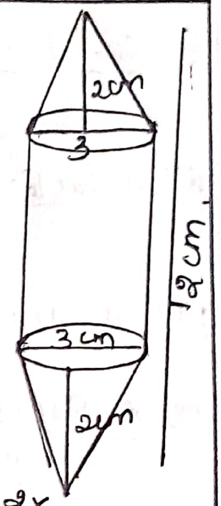
LHS

$$\frac{\cancel{(\sin A+\cos A)}(\sin^2 A-\sin A\cos A+\cos^2 A)}{\cancel{(\sin A+\cos A)}} + \frac{\cancel{(\sin A-\cos A)}(\sin^2 A+\sin A\cos A+\cos^2 A)}{\cancel{(\sin A-\cos A)}}$$

$$2\sin^2 A+2\cos^2 A = 2(\sin^2 A+\cos^2 A)$$

$$= 2(1).\ \text{RHS}.$$

38). Soln



Cylinder:

$r_1 = 3/2$ cm.

$h_1 = 12-2-2 = 8$ cm.

Cone:

$r_2 = 3/2$ cm.

$h_2 = 2$ cm.

Vol. of model = Vol. cylinder + $\overset{2\times}{(\text{Vol. of cone})}$

$$= \pi r_1^2 h_1 + 2\times\frac{1}{3}\pi r_2^2 h_2$$

$$= \pi r_1^2\left(h_1+\frac{2}{3}h_2\right)$$

$$= \frac{\cancel{22}^{11}}{7}\times\frac{3}{\cancel{2}}\times\frac{3}{2}\times\left(8+\frac{2}{3}\times 2\right)$$

$$= \frac{99}{14}\times\frac{(24+4)}{3} = \frac{\cancel{99}^{33}}{\cancel{14}_{2}}\times\frac{\cancel{28}^{\cancel{4}\,2}}{\cancel{3}}$$

$$= 66\ \text{cm}^3.$$

39). Let R – metallic sphere. $R=16$ cm

r – small sphere. $r=2$ cm

$$\text{no. of small sphere} = \frac{\text{Vol. big sphere}}{\text{Vol. small sphere}}$$

$$= \frac{\cancel{\frac{4}{3}\pi} R^3}{\cancel{\frac{4}{3}\pi} r^3} \Rightarrow \frac{\cancel{16}^{8}\times\cancel{16}^{8}\times\cancel{16}^{8}}{\cancel{2}\times\cancel{2}\times\cancel{2}}$$

$$= 8^3 = 512$$

$\therefore$ There are 512 small spheres.

40).

Sathya:	Vidhya
$\sigma_1 = 4.6$	$\sigma_2 = 2.4.$
$\bar{x}_1 = \frac{\cancel{460}^{92}}{\cancel{5}}$	$\bar{x}_2 = \frac{\cancel{480}^{96}}{\cancel{5}}$

$\bar{x}_1 = 92$ $\qquad$ $\bar{x}_2 = 96$.

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

$= \frac{\cancel{4.6}^{\,2.3}}{\cancel{92}_{\,46\,23}} \times \cancel{100}^{\,50}$

$C.V_1 = 5$

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

$= \frac{2.4}{96} \times 100$

$\boxed{C.V_2 = 2.5}$

$\therefore$ Vidhya is more consistent than Sathya.

41). Soln : A bag balls.

$n(S) = \overset{R}{5} + \overset{W}{6} + \overset{G}{7} + \overset{B}{8} = 26$.

$A \to$ Red balls $n(A) = 5$, $B \to$ white $n(B) = 6$

$C \to$ Green $n(C) = 7$, $D \to$ black $n(D) = 8$.

(i) White $\quad P(B) = \frac{n(B)}{n(S)} = \frac{\cancel{6}^{\,3}}{\cancel{26}_{\,13}} = \frac{3}{13}$.

(ii) Black or Red $\quad$ Black $P(D) = \frac{n(D)}{n(S)} = \frac{8}{26}$

Red : $P(A) = \frac{n(A)}{n(S)} = \frac{5}{26}$.

$P(A) + P(D) = \frac{8}{26} + \frac{5}{26} = \frac{\cancel{13}}{\cancel{26}_{\,2}} = \frac{1}{2}$

(iii) not white:

$P(\bar{B}) = 1 - P(B)$

$= 1 - \frac{3}{13} \Rightarrow \frac{13-3}{13}$

$\boxed{P(\bar{B}) = \frac{10}{13}}$

(iv) neither white nor black $\quad$ Red & green

$P(A) + P(C) = \frac{5}{26} + \frac{7}{26} = \frac{\cancel{12}^{\,6}}{\cancel{26}_{\,13}}$

$= \frac{6}{13}$

42). Soln $(a-b)^2 = a^2 - 2ab + b^2$.

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

$x^2 - 2x + 1 + x^2 - 4x + 4 + x^2 - 6x + 9 = 0$

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

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

$\Delta = b^2 - 4ac$

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

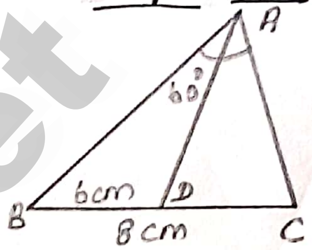
$= 144 - 168$

$\boxed{\Delta = -24 < 0}$

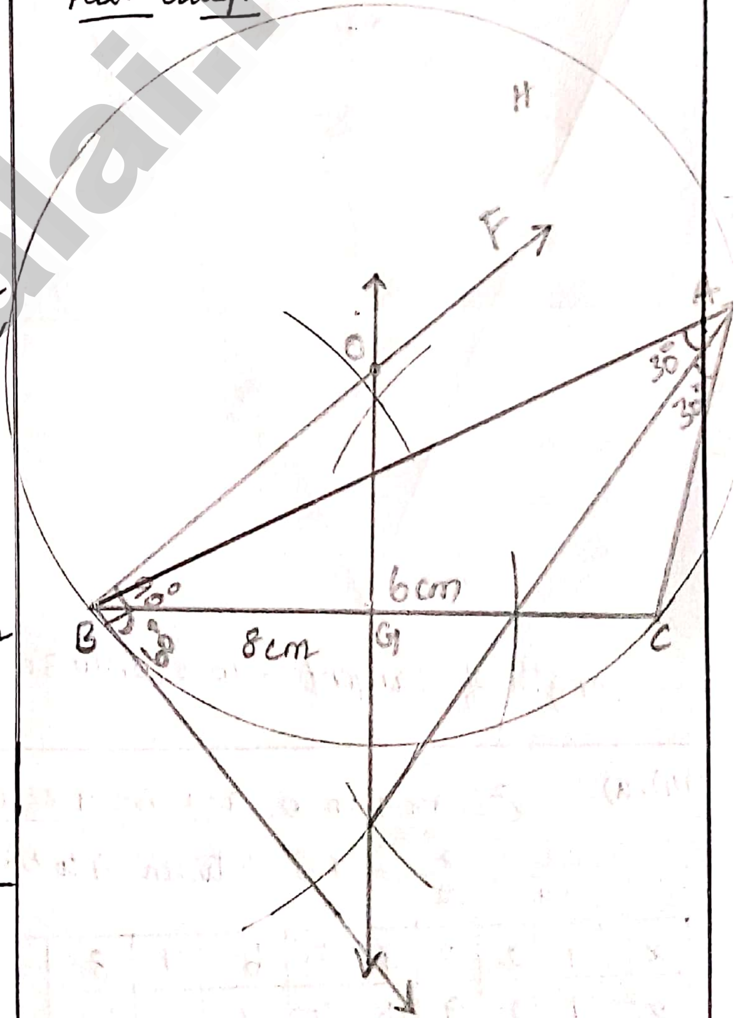
$\therefore$ No real roots.

43). a).

Rough diagram

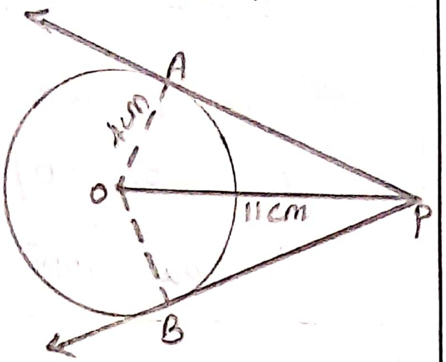


Fair diagram

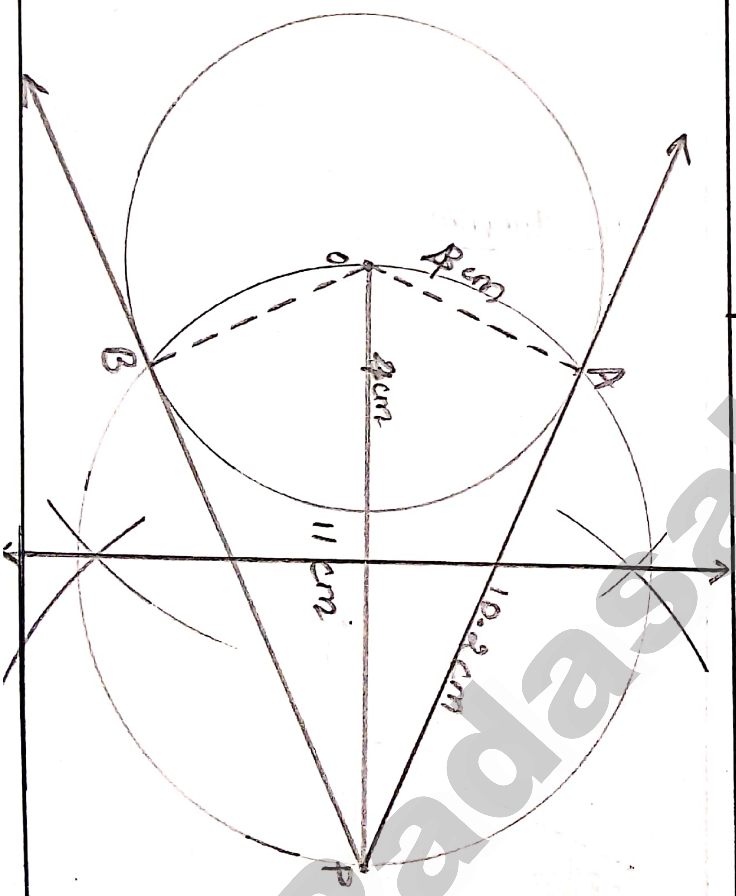


b).

Rough diagram



Fair diagram



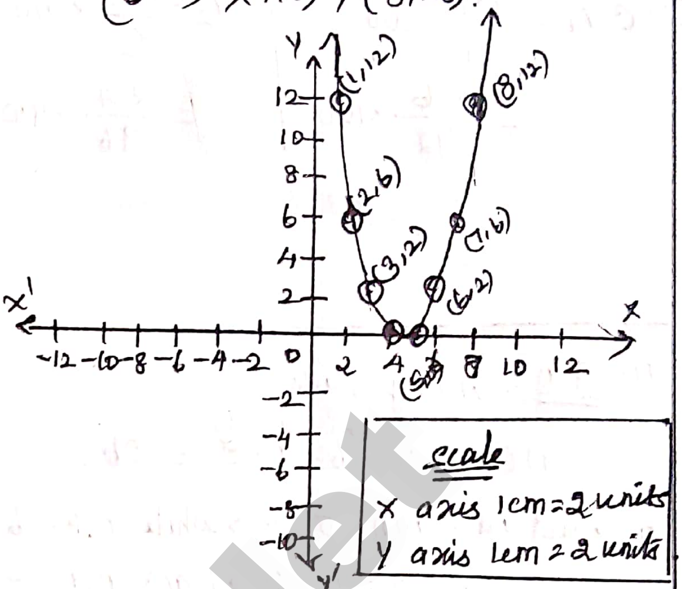
Length of Tangent = 10.2 (or) 10.3 cm.

44). a). $x^2-9x+20=0$. $a=1$ $b=-9$ $c=20$

$\frac{-b}{2a} = \frac{9}{2} = 4.5$ (between 4 to 5)

x	1	2	3	4	5	6	7	8
x^2	1	4	9	16	25	36	49	64
$-9x$	-9	-18	-27	-36	-45	-54	-63	-72
+20	+20	+20	+20	+20	+20	+20	+20	+20
y	12	6	2	0	0	2	6	12

Points: (1,12), (2,6), (3,2), (4,0) (5,0). (6,2), (7,6), (8,12).



Scale

x axis 1cm = 2 units

y axis 1cm = 2 units

nature of Solution (Intersect 2 points)

Real & unequal roots.

b).

1). Table x - time (min) y - distance (km)

time (min)	60	120	180	240	300
distance (km)	50	100	150	200	250

2). Variation x - increase y - increase.

* Direct variation. $k=\frac{y}{x}$.

$k = \frac{50}{60} = \frac{100}{120} = \ldots$ $\boxed{k = 5/6}$ $y = kx$.

3) Points: (60,50), (120,100), (180,150), (240,200)

4) (ii) In 90 min travel distance 75 km.

(iii) The time required to distance of 300 km is 360 min. 6 hrs.

Scale

x axis 1cm = 60 min

y axis 1cm = 50 km