

2024 Mathematics Level-2(E) - 0

704991

Subject Code	2024		
Subject	Mathematics Level-2		
Date	10/03/2025		
Supplements attached			
Main Answer Book	No. of Supplements	Total	
1	+ 3	= 4	
Specific remarks of centre conductor regarding malpractices (in Red Ink)			

- Mobile Phones and other electronic gadgets are strictly prohibited inside the examination hall.
- Use of non-programmable calculator is allowed ONLY in some subjects.
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- Only blue ink/ball pen is to be used for writing the answers. Black lead pencil may be used for drawing figures, diagrams and graphs. Use of any other Colour pencil/pen is strictly prohibited.
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- Candidate should check that the printed seat number is correct and verify that the answer book has all pages serial numbered before filling all other details.

Pg No	Examiner	Moderator	Chief Moderator
03	5.0	5	
04 & 05	11.0	11	
06 & 07	4.0	4	
08 & 09	4.0	4	
10 & 11	8.0	8	
12 & 13	4.0	4	
14 & 15	6.0	6	
16 & 17	4.0	4	
18	—	—	
Supp. 1	9.0	9	
Supp. 2	12.0	12	
Supp. 3	13.0	13	
Supp. 4			
Supp. 5			
Supp. 6			
TOTAL	80	80	
Total in words	Eighty	Eighty	

MARKS	E	M	CM
	5.0	5	

Pg. 03

03

Q. No.

SECTION-A

51. 3

2. unique solution

3. $x=2$ and $y=2$

$$2 + 2 \times 2 = 6$$

$$2 + 4 = 6$$

$$6 = 6$$

$$2 \times 2 - 2 = 2$$

$$4 - 2 = 2$$

$$2 = 2$$

4. $\frac{4}{5}$

$$5x^2 - 4x = 0$$

$$x(5x - 4) = 0$$

$$5x - 4 = 0$$

$$5x = 4$$

$$x = \frac{4}{5}$$

5. 32

$$a=7, a=2, d=5, n=7$$

$$a_n = a + (n-1)d$$

$$a_7 = 2 + (7-1)(5)$$

$$= 2 + (6)(5)$$

$$= 2 + 30$$

$$a_7 = 32$$

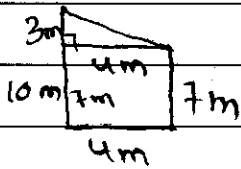
Q. No.

☐

6.

5m

6



$$9 + 16 = x^2$$

$$25 = x^2$$

$$x = 5$$

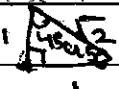
7.

0

$$\cot 45^\circ = \tan 45^\circ$$

$$1 = 1$$

$$0$$



8.

36° 54°

9.

10, 10

10.

50°

$$100 + 2x = 180$$

$$x = \frac{180 - 100}{2}$$

$$x = \frac{80}{2}$$

$$x = 40^\circ$$

$$\angle PTR = \angle PTO - \angle ORP$$

$$= 90 - 40$$

$$= 50^\circ$$

11.

77 cm²

$$\frac{1}{2} \pi r^2$$

$$\frac{1}{2} \times \frac{22}{7} \times 7 \times 7$$

MARKS	E	M	CM
Pg. 04 & 05	11.0	11	

05

Q. No.

12. 2.5 cm

5

$$P = 4S$$

$$P = 20 = 4S$$

$$S = \frac{20}{4}$$

13. 384 cm²

$$\begin{aligned} \text{TSA (cube)} &= 6S^2 \\ &= 6 \times 8^2 \\ &= 6 \times 64 \\ &= 384 \end{aligned}$$

$$\begin{array}{r} 2 \\ 64 \\ \times 6 \\ \hline 384 \end{array}$$

14. 220 cm²

$$\begin{aligned} \text{C.S.A} &= 2\pi rh \\ &= 2 \times \frac{22}{7} \times \frac{5}{10} \times 10 \\ &= 10 \times 22 \\ &= 220 \text{ cm}^2 \end{aligned}$$

15. $\frac{1}{4}$

HH, TT, TH, HT

16. 7

$$2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$$

64

Q. No.

17. Sum = $\frac{-1}{2}$, Product = $\frac{-3}{2}$

$$x^2 - (\text{Sum})x + (\text{Product}) = 0$$

$$x^2 - \left(\frac{-1}{2}\right)x + \left(\frac{-3}{2}\right) = 0$$

$$\underline{2x^2 + x - 3 = 0}$$

$\therefore$ The quadratic polynomial in x is $2x^2 + x - 3 = 0$

18. $(K-3)x + 3y = K$ $Kx + 6y = 12$

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$$

$$\frac{K-3}{K} = \frac{3}{6} = \frac{K}{12}$$

$$\frac{3}{6} = \frac{K}{12}$$

$$K = 3 \times \frac{12}{6}$$

$$\boxed{K = 6}$$

$\therefore$ The value of $K = 6$

MARKS	E	M	CM
Pg. 06 & 07	40	4	

07

Q. No.

☐

19. $r = 6 \text{ cm}, \theta = 90^\circ$

$$\begin{aligned} \text{Length of arc} &= \frac{\theta}{360} \times 2\pi r \\ &= \frac{90}{360} \times 2 \times \pi \times 6 \\ &= \pi \times 3 \end{aligned}$$

Length of arc $= 3\pi \text{ cm}$

$\therefore$ The length of arc is $3\pi \text{ cm}$

20. $P(\text{getting a vowel}) = \frac{4}{11}$

$\therefore$ The probability of getting picking vowel is $\frac{4}{11}$

Q. No.

SECTION-B

21.

2

$$105 \overline{) 120} (1$$

$$\underline{-105}$$

$$015 \overline{) 105} (7$$

$$\underline{-105}$$

$$000$$

$$\begin{array}{r} 15 \\ \times 7 \\ \hline 105 \end{array}$$

$$D = d \times Q + R$$

$$120 = 105 \times 1 + 15$$

$$105 = 15 \times 7 + 0$$

$\therefore$ The HCF of 105 & 120 is 15

21.

3

160

3

$$2^5 \times 5$$

$$= 3 \times 5^4$$

$$2^3 \times 5^5$$

$$= 3 \times 625$$

$$(2 \times 5)^5$$

$$= 1875$$

$$(10)^5$$

$$= 1875$$

$$100000$$

$$= 0.01875$$

$$\begin{array}{r} 2 \overline{) 160} \\ 2 \overline{) 80} \\ 2 \overline{) 40} \\ 2 \overline{) 20} \\ 2 \overline{) 10} \\ 5 \overline{) 5} \\ 1 \end{array}$$

$$2 \overline{) 80}$$

$$2 \overline{) 40}$$

$$2 \overline{) 20}$$

$$2 \overline{) 10}$$

$$5 \overline{) 5}$$

$$1$$

$$\begin{array}{r} 1 \\ \hline 625 \end{array}$$

$$\times 3$$

$$\hline 1875$$

$\therefore$ The decimal expansion of $\frac{3}{160}$ is 0.01875

and it is terminating.

MARKS	E	M	CM
Pg. 08 & 09	4-0	4	

09

Q. No.

22. Trapezium Circle

$$PQ = 17 \text{ cm} = a \quad r = 7 \text{ cm}$$

$$SR = 27 \text{ cm} = b$$

$$AB = 14 \text{ cm} = h$$

$$A_{\text{trapezium PQRS}} = \frac{1}{2} (a + b) h$$

$$= \frac{1}{2} (PQ + SR) \times AB$$

$$= \frac{1}{2} (17 + 27) \times 14$$

$$= \frac{1}{2} \times 44 \times 14$$

$$A_{\text{trapezium PQRS}} = \underline{308 \text{ cm}^2}$$

$$A_{\text{circle}} = \pi r^2$$

$$= \frac{22}{7} \times 7 \times 7$$

$$A_{\text{circle}} = \underline{154 \text{ cm}^2}$$

$$A_{\text{shaded region}} = A_{\text{trapezium PQRS}} - A_{\text{circle}}$$

$$= 308 - 154$$

$$A_{\text{shaded region}} = \underline{154 \text{ cm}^2}$$

∴ The area of shaded region is 154 cm²

Q. No.

23. Modal Class = 35-45 | $f_1 = 23$

$$J = 35$$

$$f_0 = 21$$

$$h = 10$$

$$f_2 = 15$$

$$\text{Mode} = J + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) \times h$$

$$= 35 + \left(\frac{23 - 21}{2 \times 23 - 21 - 15} \right) \times 10$$

$$= 35 + \left(\frac{2}{46 - 36} \right) \times 10$$

$$= 35 + \left(\frac{2}{10} \right) \times 10$$

$$= 35 + 2$$

$$\text{Mode} = 37$$

$\therefore$ The mode of data is 37.

24. $\tan F = \frac{DE}{EF} = \frac{7K}{24K}$

$\therefore$ The length of $DE = 7K$ & $EF = 24K$

$$DE^2 + EF^2 = DF^2 \quad (\text{By pythagorean thm})$$

$$(7K)^2 + (24K)^2 = DF^2$$

$$49K^2 + 576K^2 = DF^2$$

$$625K^2 = DF^2$$

$$DF = 25K$$

$$\sin D = \frac{EF}{DF} = \frac{24K}{25K} = \frac{24}{25}$$

$$\sin D = \frac{24}{25}$$

$\therefore$ The value of $\sin D$ is $\frac{24}{25}$.

MARKS	E	M	CM
Pg. 10 & 11	8.0	8	

Q. No.

25. $4 \sin^2 60^\circ \times \tan^2 45^\circ - \tan^2 60^\circ$

$= 4 \left(\frac{\sqrt{3}}{2} \right)^2 \times \left(\frac{1}{1} \right)^2 - \left(\frac{\sqrt{3}}{1} \right)^2$

$= \cancel{4} \times \frac{3}{\cancel{4}} \times 1 - 3$

$= 3 - 3$

$= 0$

$\therefore$ The value is 0.

26. $\frac{\text{Area}(\Delta XYZ)}{\text{Area}(\Delta STR)} = \left(\frac{YZ}{TR} \right)^2$

$\frac{9}{4} = \frac{15^2}{TR^2}$

$TR^2 = \frac{15 \times 15 \times 4}{9}$

$TR = \frac{15 \times 2}{3}$

$TR = 10 \text{ cm}$

$\therefore$ The length of TR is 10 cm

Q. No.

27. $A(8, -2)$ $B(-3, -6)$
 x_1, y_1 x_2, y_2

$$D = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$AB = \sqrt{(-3 - 8)^2 + (-6 + 2)^2}$$

$$AB = \sqrt{(-11)^2 + (-4)^2}$$

$$AB = \sqrt{121 + 16}$$

$$AB = \sqrt{137} \text{ units}$$

$\therefore$ The distance between AB is $\sqrt{137}$ units.

27. $P(6, 4)$ $Q(2, -8)$ $(1:1)$ $(x, y)?$
 x_1, y_1 x_2, y_2 m_1, m_2

$$x = \frac{x_1 + x_2}{2}$$

$$x = \frac{6 + 2}{2}$$

$$x = \frac{8}{2}$$

$$x = 4$$

$$y = \frac{y_1 + y_2}{2}$$

$$y = \frac{4 - 8}{2}$$

$$y = \frac{-4}{2}$$

$$y = -2$$

$\therefore$ The point which divides the segment is $x = 4, y = -2, [4, -2]$

MARKS	E	M	CM
Pg. 12 & 13	4.0	4	

13

Q. No.

28.

$L(6, 4)$, $M(-3, 4)$, $N(6, -2)$
 x_1, y_1 x_2, y_2 x_3, y_3

2

$$\begin{aligned}
 \text{Area}(\triangle LMN) &= \frac{1}{2} [x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)] \\
 &= \frac{1}{2} [(6)(4 - (-2)) + (-3)(-2 - 4) + (6)(4 - 4)] \\
 &= \frac{1}{2} [(6 \times 6) + (-3 \times -6) + (6 \times 0)] \\
 &= \frac{1}{2} [36 + 18 + 0] \\
 &= \frac{1}{2} [54]
 \end{aligned}$$

$$\text{Area}(\triangle LMN) = 27 \text{ sq. units}$$

$\therefore$ The area of $\triangle LMN$ is 27 sq. units

Q. No.

SECTION - C

29.

$$\begin{array}{r}
 \cancel{2x^2} \\
 x-2 \overline{) 2x^3 - 13x^2 + 29x - 45} \\
 \underline{2x^3 - 4x^2} \\
 9x^2 + 29x - 45
 \end{array}$$

29.

$$\begin{array}{r}
 \cancel{2x^2 - 9x + 11} \\
 x-2 \overline{) 2x^3 - 13x^2 + 29x - 45} \\
 \underline{2x^3 - 4x^2} \\
 -9x^2 + 29x - 45 \\
 \underline{-9x^2 + 18x} \\
 11x - 45 \\
 \underline{11x - 22} \\
 -23
 \end{array}$$

$$\text{Quotient} = 2x^2 - 9x + 11$$

$$\text{Remainder} = -23$$

$$\begin{aligned}
 \text{Dividend} &= \text{Divisor} \times \text{Quotient} + \text{Remainder} \\
 (2x^3 - 13x^2 + 29x - 45) &= (x-2)(2x^2 - 9x + 11) + (-23)
 \end{aligned}$$

MARKS	E	M	CM
Pg. 14 & 15	6.0	6	

15

Q. No.

30.

$$\begin{array}{rcl} 4x - 3y = 10 & \text{---} \times 2 & \\ 2x + 5y = 18 & \text{---} \times 4 & \end{array}$$

$$\begin{array}{r} 8x - 6y = 20 \\ 8x + 20y = 72 \\ \hline -26y = -52 \end{array}$$

$$-26y = -52$$

$$y = \frac{-52}{-26} = 2$$

$$\boxed{y = 2}$$

Put $y = 2$ in eqn $4x - 3y = 10$

$$4x - 3y = 10$$

$$4x - 3 \times 2 = 10$$

$$4x - 6 = 10$$

$$4x = 10 + 6$$

$$x = \frac{16}{4}$$

4

$$\boxed{x = 4}$$

$\therefore$ The value of $x = 4$ & $y = 2$

Q. No.

30.

$$6x - 5y = 9$$

$$4x - y = -1$$

$$4x - y = -1$$

$$4x + 1 = y$$

Put $y = 4x + 1$ in eqn $6x - 5y = 9$

$$6x - 5y = 9$$

$$6x - 5(4x + 1) = 9$$

$$6x - 20x - 5 = 9$$

$$-14x = 9 + 5$$

$$-14x = 14$$

$$x = \frac{14}{-14}$$

$$-1$$

$$x = -1$$

Put $y = -1$ in eqn $4x - y = -1$

$$4x - y = -1$$

$$4x - (-1) = -1$$

$$4x + 1 = -1$$

$$4x = -1 - 1$$

$$x = \frac{-2}{4}$$

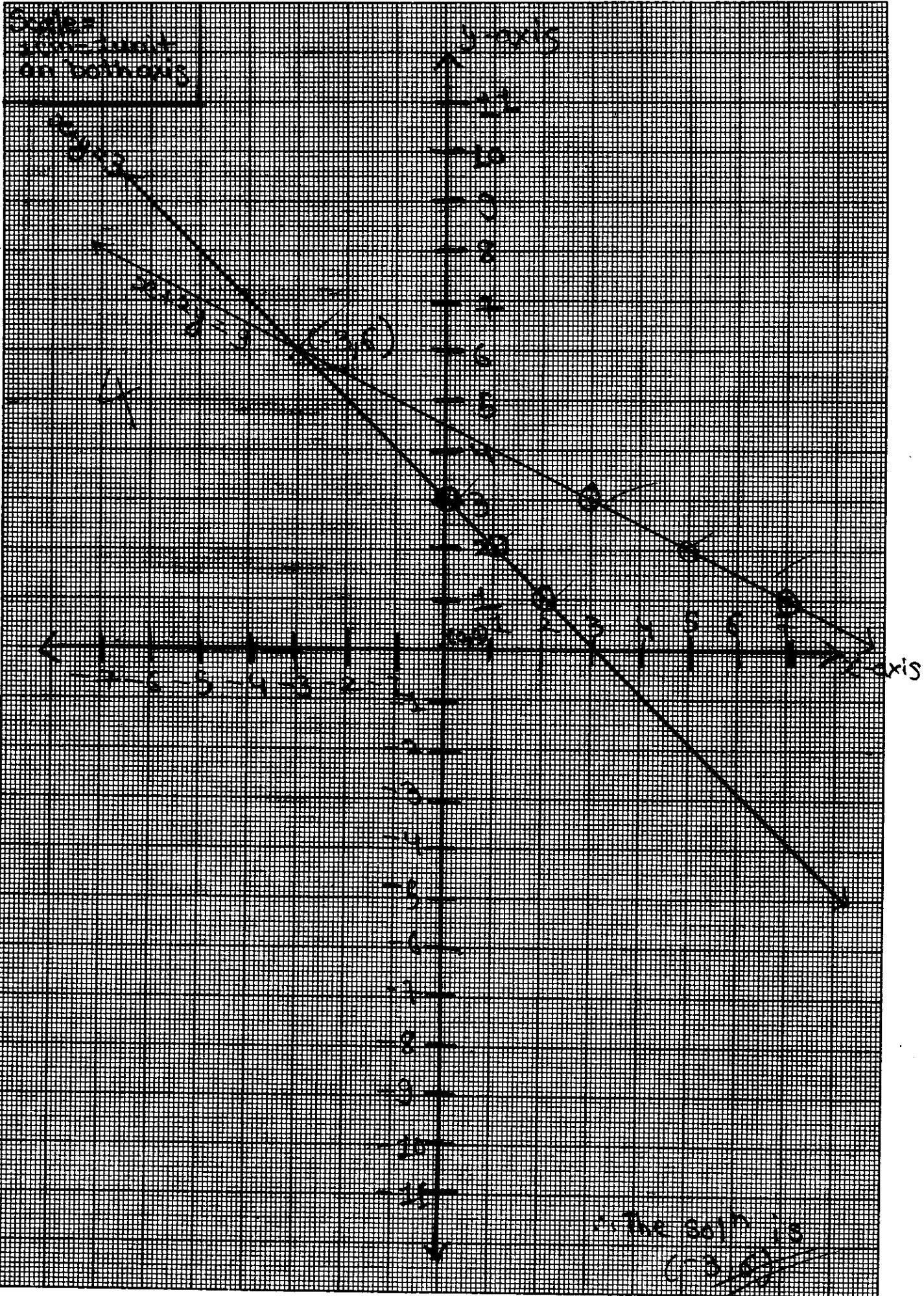
$$\frac{-1}{2}$$

MARKS	E	M	CM
Pg. 16 & 17	4.0	4.	

17

Q. No. 42.

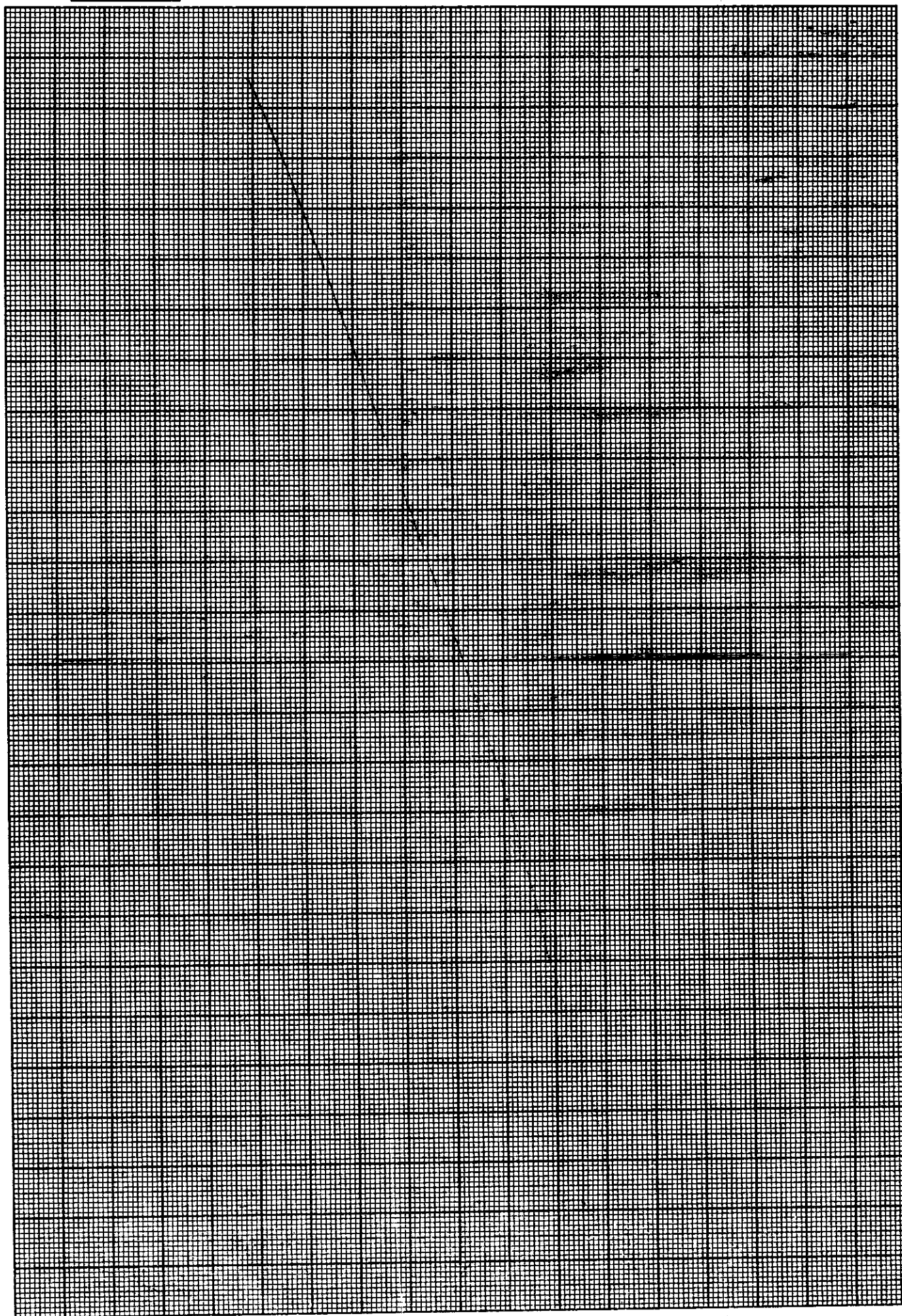
Centimeters



MARKS	E	M	CM
Pg. 18	—		

Q. No.

Centimeters



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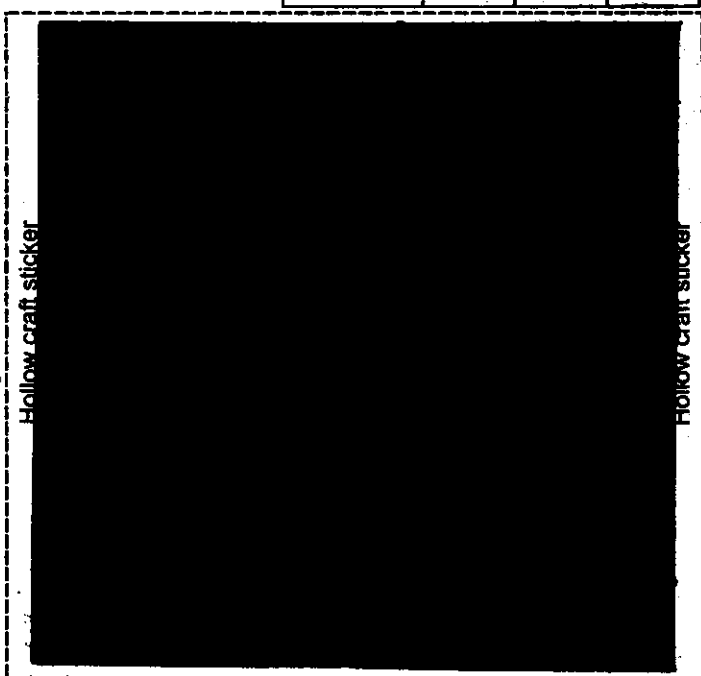


SSC/HSSC Examination March/April/June 20__

Supplement Answer Book

Subject Code	2024
Date	10/03/2025

MARKS	E	M	CM
Pg. 1 to 4	9.0	9	



Q. No.

01

30.

$$6x - 5y = 9$$

$$4x - y = -1$$

$$4x - y = -1$$

$$-y = -1 - 4x$$

$$y = -(-1 - 4x)$$

$$y = 1 + 4x$$

Put $y = 1 + 4x$ in eqn $6x - 5y = 9$

$$6x - 5y = 9$$

$$6x - 5(1 + 4x) = 9$$

$$6x - 5 - 20x = 9$$

$$6x - 20x = 9 + 5$$

$$-14x = 14$$

$$x = \frac{14}{-14}$$

$$x = -1$$

$$x = -1$$

Put $x = -1$ in eqn $4x - y = -1$

$$4x - y = -1$$

$$4(-1) - y = -1$$

$$4x - y = -1$$

$$4(-1) - y = -1$$

$$-4 - y = -1$$

$$-y = -1 + 4$$

$$-y = 3$$

$$y = -3$$

$$\boxed{y = -3}$$

$\therefore$ The value of $x = -1$ and $y = -3$

$$31. \quad 2x^2 - 17x + 21 = 0$$

$$2x^2 - 14x - 3x + 21 = 0$$

$$2x(x-7) - 3(x-7) = 0$$

$$(2x-3)(x-7) = 0$$

$$2x-3=0 \text{ and } x-7=0$$

$$x = \frac{3}{2} \text{ and } x = 7$$

$\therefore$ The roots of are $\frac{3}{2}$ and 7

$$32. \quad 2x^2 + 3x - 44 = 0$$

$$D = b^2 - 4ac$$

$$= (3)^2 - 4 \times 2 \times -44$$

$$= 9 + 352$$

$$D = 361$$

Q. No.

$$x = \frac{-b \pm \sqrt{D}}{2a}$$

$$x = \frac{-3 \pm \sqrt{36}}{2 \times 2}$$

$$x = \frac{-3 \pm 6}{4}$$

$$x = \frac{-3+6}{4}$$

$$x = \frac{3}{4}$$

$$\boxed{x=4}$$

$$x = \frac{-3-6}{4}$$

$$x = \frac{-9}{4}$$

$$\boxed{x = -\frac{9}{4}}$$

∴ The roots are 4 and $-\frac{9}{4}$

33. 3rd term is 13, 10th term is -1.

$$a + a_3 = a + 2d = 13, \quad a_{10} = a + 9d = -1$$

$$a_3 =$$

$$a + 2d = 13$$

$$a + 9d = -1$$

$$-7d = 14$$

$$d = -2$$

$$\boxed{d = -2}$$

Put $d = -2$ in eqn $a + 2d = 13$

$$a + 2d = 13$$

$$a + 2(-2) = 13$$

$$a - 4 = 13$$

$$a = 13 + 4 \Rightarrow \boxed{a = 17}$$

$\therefore$ First term $= a = 17$, $d = -2$, $n = 20$

$$S_n = \frac{n}{2} [2a + (n-1)d]$$

$$S_{20} = \frac{20}{2} [2 \times 17 + (20-1)(-2)]$$

$$= 10 [34 + (19)(-2)]$$

$$= 10 [34 - 38]$$

$$= 10 \times -4$$

$$S_{20} = -40$$

$\therefore$ The sum of 20 terms is -40.

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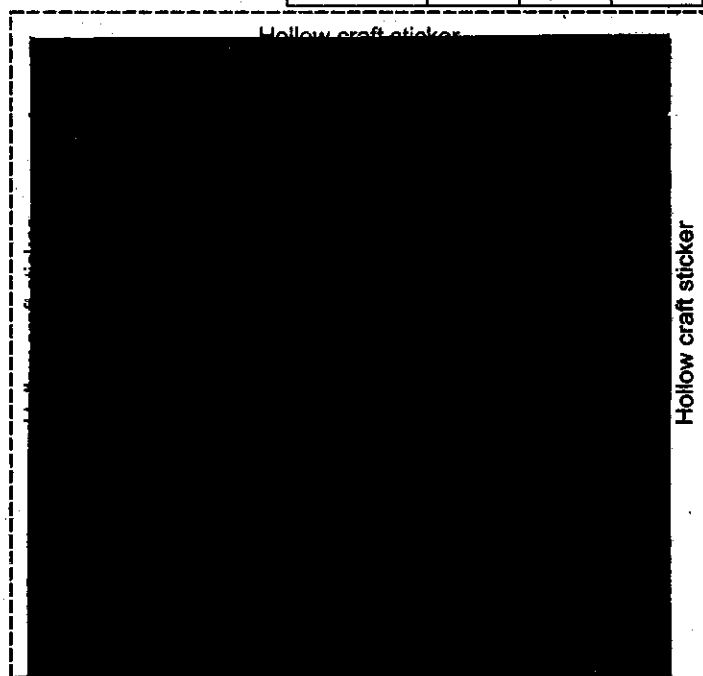


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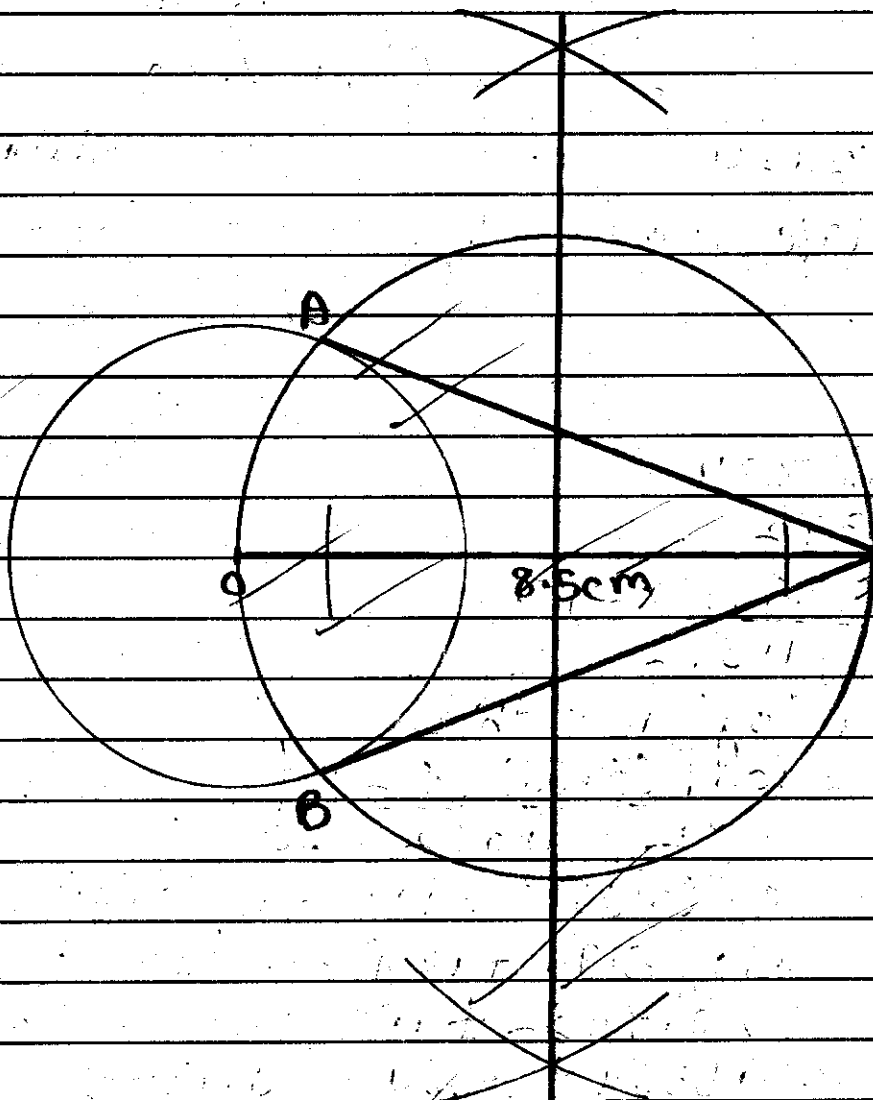
Supplement Answer Book

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MARKS	E	M	CM
Pg. 1 to 4	12.0	12	



Q. No.		01
34.	$\frac{(5.96)^2 \times 24}{1.372}$ $x = \frac{(5.96)^2 \times 24}{1.372}$ Taking log on both sides $\log x = \log \left[\frac{(5.96)^2 \times 24}{1.372} \right]$ $\log x = \log (5.96)^2 + \log 24 - \log 1.372$ $\log x = 2 \log 5.96 + \log 24 - \log 1.372$ $\log x = 2 \times 0.7752 + 1.3802 - 0.1373$ $\log x = 1.5504 + 1.3802 - 0.1373$ $\log x = 2.7933$ $\text{anti log}(\log x) = \text{anti log}(2.7933)$ $x = 621.3$ $\frac{(5.96)^2 \times 24}{1.372} = 621.3$	

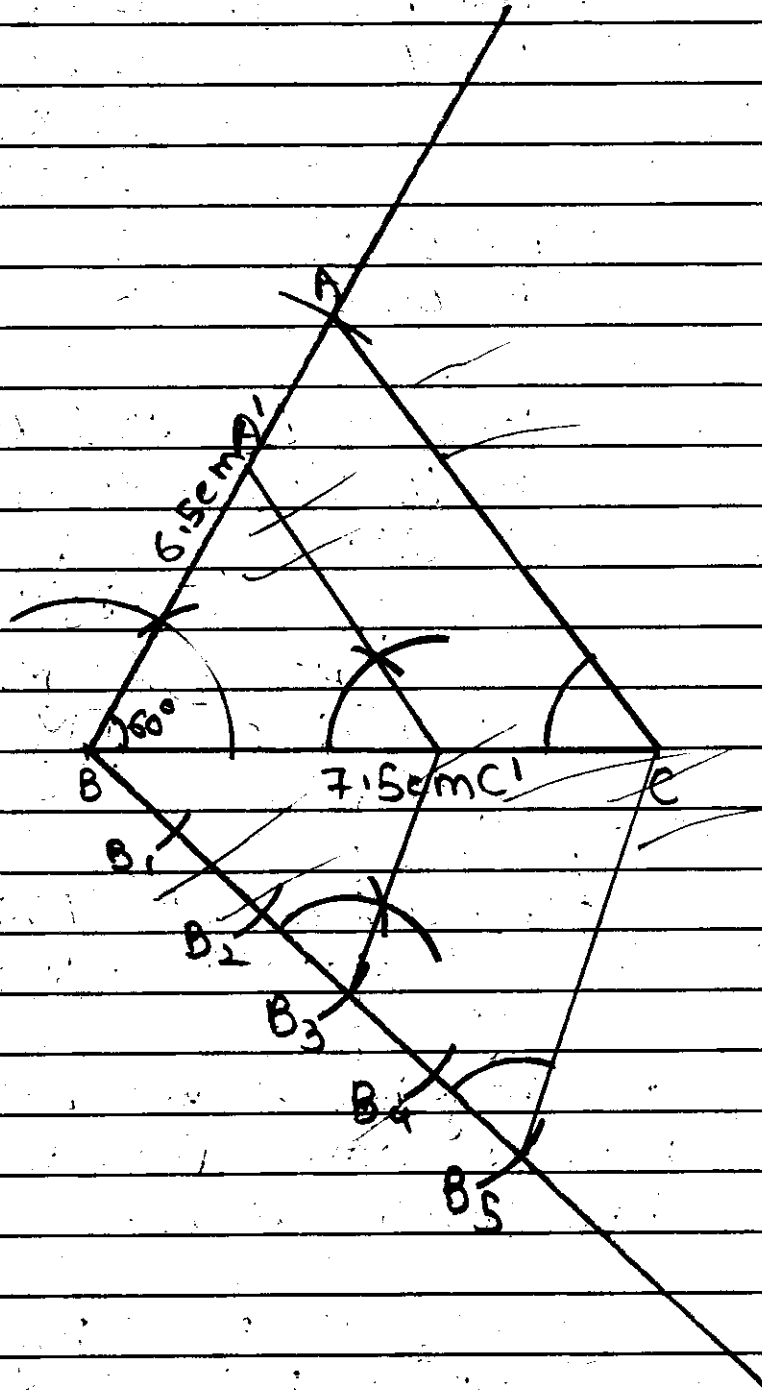


$$PA = PB = 7.8 \text{ cm}$$

Q. No.

38.

3



Proof :-

Consider $\triangle TLM$ & $\triangle LMR$

$$1] \frac{A_M(\triangle TLM)}{A_M(\triangle LMR)} = \frac{\frac{1}{2} \times b \times h}{\frac{1}{2} \times b \times h} \\ = \frac{TL \times BM}{LR \times BM}$$

$$2] \frac{A_M(\triangle TLM)}{A_M(\triangle LMR)} = \frac{TL}{LR}$$

Consider $\triangle TLM$ & $\triangle LMS$

$$3] \frac{A_M(\triangle TLM)}{A_M(\triangle LMS)} = \frac{\frac{1}{2} \times b \times h}{\frac{1}{2} \times b \times h} \\ = \frac{TM \times AL}{MS \times AL}$$

$$4] \frac{A_M(\triangle TLM)}{A_M(\triangle LMS)} = \frac{TM}{MS}$$

$$5] A_M(\triangle LMR) = A_M(\triangle LMS) \\ L.H.S. = L.H.S.$$

As they have same base & lies between same parallels $LM \parallel RS$ have equal areas.

$$6] \frac{TL}{LR} = \frac{TM}{MS} \quad [\text{By 1, 2, 3, 4, 5}]$$

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Supplement Answer Book

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MARKS	E	M	CM
Pg. 1 to 4	13.0	13	

Hollow craft sticker

Q. No.

01

38. $AC = 5.4 \text{ m}$, $AB = ?$

$$\sin 45^\circ = \frac{AB}{AC}$$

$$\frac{1}{\sqrt{2}} = \frac{AB}{5.4}$$

$$AB = \frac{5.4}{\sqrt{2}}$$

$$AB = \frac{5.4 \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}}$$

$$AB = \frac{5.4 \times \sqrt{2}}{2}$$

$$AB = 2.7\sqrt{2} \text{ m}$$

$\therefore$ The length of house wall is $2.7\sqrt{2} \text{ m}$



39. Proof:-

Consider $\triangle AOT$ & $\triangle BOT$

- 1] $OA = OB$ [Radii of same circle]
- 2] $OT = OT$ [Common side]
- 3] $\angle OAT = \angle OBT$ [Tangent Perp. Thm.]
- 4] $\triangle AOT \cong \triangle BOT$ [By RHS Cong. rule]
- 5] $TA = TB$ [C.P.C.T.]

40. Sphere

$$r_1 = \frac{45}{10}$$

Cylinder

$$r_2 = 5 \text{ cm}$$

$$h = ?$$

V. of Sphere = V. of Cylinder

$$\frac{4}{3} \pi r_1^3 = \pi r_2^2 h$$

$$\frac{4}{3} r_1^3 = r_2^2 h$$

$$\frac{4}{3} \times \frac{45}{10} \times \frac{45}{10} \times \frac{45}{10} = 5 \times 5 \times h$$

$$\frac{4 \times 45 \times 45 \times 45}{3 \times 10 \times 10 \times 10} = h$$

$$h = 4.86 \text{ cm}$$

$\therefore$ The height of cylinder is 4.86 cm

Q. No.

41.

Donation Collection (₹) (C.I.)	Number of Student (f_i)	Class Mark (x_i)	$f_i x_i$
150-250	02	200	400
250-350	04	300	1200
350-450	07	400	2800
450-550	09	500	4500
550-650	10	600	6000
650-750	08	700	5600
	$\Sigma f_i = 40$		$\Sigma f_i x_i = 20500$

$$\text{Mean} = \bar{x} = \frac{\Sigma f_i x_i}{\Sigma f_i}$$

$$\bar{x} = \frac{20500}{40}$$

$$\bar{x} = 512.5$$

$\therefore$ The mean of data is 512.5

$$x + y = 3$$

x	2	1	0
y	1	2	3

$$x + y = 3$$

$$x = 3 - y$$

$$y = 1$$

$$x = 3 - 1$$

$$x = 2$$

$$x = 3 - y$$

$$y = 2$$

$$x = 3 - 2$$

$$x = 1$$

$$x = 3 - y$$

$$y = 3$$

$$x = 3 - 3$$

$$x = 0$$

$$x + 2y = 9$$

x	7	5	3
y	1	2	3

$$x + 2y = 9$$

$$x = 9 - 2y$$

$$y = 1$$

$$x = 9 - 2 \times 1$$

$$x = 9 - 2$$

$$x = 7$$

$$x = 9 - 2y$$

$$y = 2$$

$$x = 9 - 2 \times 2$$

$$x = 9 - 4$$

$$x = 5$$

$$x = 9 - 2y$$

$$y = 3$$

$$x = 9 - 2 \times 3$$

$$x = 9 - 6$$

$$x = 3$$

∴ The val soln is $(-3, 6)$ $x = -3, y = 6$