THIRD REVISION TEST - 2025

THena

Standard X

Reg.No.

MATHEMATICS

5/3/25

Time : 3.00 hrs **Part - I** ***Marks : 100***

I. Choose the correct answer: **14 x 1 = 14**

1. If there are 1024 relations from a set A = {1,2,3,4,5} to a set B, then the number of elements in B is ______.
   a) 3 b) 2 c) 4 d) 8
2. If $f : A \rightarrow B$ is a bijective function and if n(B) = 7, then n(A) is equal to ______.
   a) 7 b) 49 c) 1 d) 14
3. If the HCF of 65 and 117 is expressible in the form of 65m – 117, then the value of m is ______.
   a) 4 b) 2 c) 1 d) 3
4. If the sequence $t_1, t_2, t_3, \ldots\ldots\ldots$ are in A.P. then the sequence $t_6, t_{12}, t_{18}, \ldots\ldots\ldots$ is ______.
   a) a geometric progression b) an arithmetic progression
   c) neither an A.P nor a G.P d) a constant sequence
5. Find the matrix X if $2X + \begin{pmatrix} 1 & 3 \\ 5 & 7 \end{pmatrix} = \begin{pmatrix} 5 & 7 \\ 9 & 5 \end{pmatrix}$
   a) $\begin{pmatrix} -2 & -2 \\ 2 & -1 \end{pmatrix}$ b) $\begin{pmatrix} 2 & 2 \\ 2 & -1 \end{pmatrix}$ c) $\begin{pmatrix} 1 & 2 \\ 2 & 2 \end{pmatrix}$ d) $\begin{pmatrix} 2 & 1 \\ 2 & 2 \end{pmatrix}$
6. The solution of $(2x - 1)^2 = 9$ is equal to ______.
   a) –1 b) 2 c) (–1,2) d) None of the above
7. A tangent is perpendicular to the radius at the ______.
   a) Centre b) Point of contact c) Infinity d) Chord
8. The area of a triangle formed by the points (–5,0) (0,–5) and (5,0) is
   a) 0 sq.units b) 25 sq.units c) 5 sq.units d) None of these
9. The value of $\sin^2\theta + \frac{1}{1+\tan^2\theta}$ is ______.
   a) $\tan^2\theta$ b) 1 c) $\cot^2\theta$ d) 0
10. If the radius of the cylinder is doubled, the new volume of the cylinder will be ______ times the original volume.
    a) same b) 3 c) 4 d) 2

11. The height of a right circular cone whose radius is 5 cm and slant height is 13 cm is ______.

a) 12 cm b) 10 cm c) 13 cm d) 5 cm

12. Two poles of height 6 m and 11 m stand vertically on a plane ground. If the distance between their feet is 12 m, what is the distance between their tops?

a) 13 m b) 14 m c) 15 m d) 12.8 m

13. If the standard deviation of x,y,z is P, then the standard deviation of 3x+5, 3y+5, 3z+5 is ______.

a) 3P + 5 b) 3P c) P + 5 d) 9P + 15

14. Kamalam went to a play a lucky draw contest. 135 tickets of the lucky draw were sold. If the probability of Kamalam winning is $\frac{1}{9}$, then the number of tickets bought by Kamalam is ______.

a) 5 b) 10 c) 15 d) 20

Part - II

II. Answer any 10 questions. (Q.No.28 is compulsory) **10 x 2 = 20**

15. If B x A = {(–2,3) (–2,4) (0,3) (0,4) (3,3) (3,4)} then find A and B

16. A relation f is defined by $f(x) = x^2 - 2$ where $x \in \{-2,-1,0,3\}$ (i) List the elements of f (ii) Is f a function?

17. Find the sum of the series $3+1+\frac{1}{3}+......\infty$

18. Find the number of terms in an A.P 3, 6, 9, 12........ 111

19. Find the LCM of $-9a^3b^2$, $12a^2b^2c$

20. If $A = \begin{bmatrix} \sqrt{7} & -3 \\ -\sqrt{5} & 2 \\ \sqrt{3} & -5 \end{bmatrix}$ then find the transpose –A

21. The perimeter of two similar triangles ABC and PQR are respectively 36 cm and 24 cm. If PQ = 10 cm, find AB

22. Prove that $\sec\theta - \cos\theta = \tan\theta \sin\theta$

23. Find the angle of elevation of the top of a tower from a point on the ground, which is 30 m away from the foot of the tower of height $10\sqrt{3}$ m.

24. If the total surface area of a cone of radius 7 cm is 704 cm^2, then find its slant height.

25. If the circumference of a conical wooden piece is 484 cm, then find its volume when its height is 105 cm.

26. Find the range and co-efficient of range for 63, 89, 98, 125, 79, 108, 117, 68
27. In a leap year, find the probability of getting 53 Saturdays.
28. Find the equation of a straight line passing through the point (–1,2) and whose angle of inclination is 45°

Part - III

III. Answer any 10 questions. (Q.No.42 is compulsory) $10 \times 5 = 50$

29. If A = {1,2,3}, B = {2,3,5}, C = {3,4}, D = {1,3,5}, then prove that $(A \cap C) \times (B \cap D) = (A \times B) \cap (C \times D)$

30. A function $f : [-5, 9] \to R$ is defined as $f(x) = \begin{cases} 6x+1 & \text{if } -5 \le x < 2 \\ 5x^2 - 1 & \text{if } 2 \le x < 6 \\ 3x - 4 & \text{if } 6 \le x \le 9 \end{cases}$, find

    i) $2f(4) + f(8)$ ii) $\frac{2f(-2) - f(6)}{f(4) + f(-2)}$

31. Determine the general term of an A.P whose 7th term is –1 and 16th term is 17
32. If $x^4 - 8x^3 + mx^2 + nx + 16$ is a perfect square, then find the value of m and n
33. A bus covers a distance of 90 km at a uniform speed. Had the speed been 15 km/hour more it would have taken 30 minutes less for the journey. Find the original speed of the bus.

34. Show that the angle bisector of a triangle are concurrent.
35. Find the area of the quadrilateral formed by the points (8,6) (5,11) (-5,12) and (–4,3).
36. Find the equation of a straight line through the intersection of lines $7x + 3y = 10$, $5x - 4y = 1$ and parallel to the line $13x + 5y + 12 = 0$
37. If $\operatorname{cosec}\theta + \cot\theta = P$, then prove that $\cos\theta = \frac{P^2 - 1}{P^2 + 1}$
38. The angle of elevation of the top of a cell phone tower from the foot of a high apartment is 60° and the angle of depression of the foot of the tower from the top of the apartment is 30°. If the height of the apartment is 50 m, find the height of the cell phone tower. According to the rediation control norms, the minimum height of the cell phone tower should be 120 m. State if the height of the above mentioned cell phone tower meets the radiation norms.
39. A right circular cylinder container of base radius 6 cm and height 15 cm is full of ice-cream. The ice-cream is to be filled in cones of height 9 cm and a base radius 3 cm, having a hemispherical cap. Find the number of cones needed to empty the container.

40. A container open at the top is in the form of a frustrum of a cone of height 16 cm with radii of its lower and upper ends are 8 cm and 20 cm respectively. Find the cost of milk which can completely fill a container at the rate of ₹40 per litre.

41. Three unbiased coins are tossed. Find the probability of getting atmost 2 tails or atleast 2 heads.

42. Find the mean and variance of the first n natural numbers.

Part - IV

IV. Answer all the questions. **2 x 8 = 16**

43.a) A school announces that for a certain competition the cash price will be distributed for all the participants equally as shown below :

No. of participants (x)	2	4	6	8	10
Amount for each participant in ₹ (y)	180	90	60	45	36

i) Find the constant of variation

ii) How much each participant will get if the number of participants are 12

(OR)

b) Draw the graph for $y = x^2 + 3x - 4$ and hence solve $x^2 + 3x - 4 = 0$

44. a) Construct a triangle similar to a given triangle ABC with its sides equal to $\frac{6}{5}$ of the corresponding sides of the triangle ABC. (Scale factor $\frac{6}{5}$)

(OR)

b) Take a point which is 11 cm away from the centre of a circle of radius 4 cm and draw the two tangents of the circle from that point.

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III- REVISION TEST -2025, X-STD

I

1. b (2)
2. a (7)
3. b (2)
4. b - an A.P
5. b $\begin{pmatrix} 2 & 2 \\ 2 & -1 \end{pmatrix}$
6. c (-1, 2)
7. b - Point of Contact
8. b - 25 sq units
9. b (1)
10. c (4)
11. a - 12 cm
12. a - 13 m
13. b - 3P
14. c - (15)

II

(15) $A = \{3, 5\}$

$B = \{2, 4\}$

(16) $f(x) = x^2 - 2$

$f(-2) = (-2^2) - 2 = 2$

$f(-1) = (-1^2) - 2 = -1$

$f(0) = 0^2 - 2 = -2$

$f(3) = 3^2 - 2 = 7$

$\therefore f = \{(-2, 2)(-1, -1)(0, -2)(3, 7)\}$

(17) $a = 3,\ r = \frac{1}{3}$

$S_\infty = \frac{a}{1-r}$

$= \frac{3}{1 - 1/3} = \frac{9}{2}$

(18) $a = 3,\ d = 3$

$l = 111$

$n = \left(\frac{111 - 3}{3}\right) + 1$

$= 37$

(19) $9a^3b^2 = 3 \times 3a^3b^2$

$12a^2b^2c = 3 \times 4a^2b^2c$

$LCM = 36a^3b^2c$

(20) $(-A)^T = \begin{bmatrix} -\sqrt{7} & \sqrt{5} & -\sqrt{3} \\ 3 & -2 & 5 \end{bmatrix}$

(21) $\frac{AB}{PQ} = \frac{BC}{QR} = \frac{AC}{PR} = \frac{36}{24}$

$\frac{AB}{PQ} = \frac{36}{24} \Rightarrow \frac{AB}{10} = \frac{36}{24}$

$AB = \frac{36 \times 10}{24} = 15\,cm$

(22) LHS

$\sec\theta - \cos\theta$

$= \frac{1}{\cos\theta} - \cos\theta$

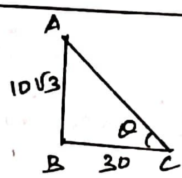
$= \frac{1 - \cos^2\theta}{\cos\theta}$

$= \frac{\sin^2\theta}{\cos\theta}$

$= \frac{\sin\theta}{\cos\theta} \cdot \sin\theta$

$= \tan\theta \cdot \sin\theta$

$= RHS$

(23) 

$\tan\theta = \frac{AB}{BC}$

$= \frac{10\sqrt{3}}{30}$

$= \frac{\sqrt{3}}{3} = \frac{1}{\sqrt{3}}$

(24) $r = 7\,cm$

$TSA = \pi r(l + r)$ sq. units

$704 = \frac{22}{7} \times 7(l + 7)$

$32 = l + 7$

$32 - 7 = l$

$l = 25\,cm$

(25) $h = 105\,cm$

Circum of base $= 484\,cm$

$2\pi r = 484$

$2 \times \frac{22}{7} \times r = 484$

$r = \frac{484 \times 7}{2 \times 22} = 77\,cm.$

$V = \frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \frac{22}{7} \times 77 \times 77 \times 105$

$= 110 \times 5929$

$= 652190\,cm^3$

(28) $\theta = 45^\circ,\ m = 1\ (-1, 2)\quad y - y_1 = m(x - x_1)$

$y - 2 = 1(x + 1) \Rightarrow x - y + 3 = 0$

(26) $L - S$

$125 - 63 = 62$

Co-eff. of R $= \frac{L - S}{L + S}$

$= \frac{125 - 63}{125 + 63} = \frac{62}{188}$

$= 0.329 = 0.33$

(27) Leap year $= 366$ days

52 full week 2 days

52 Sat. must be in 52 full weeks.

$S = \{S\text{-}M, M\text{-}T, T\text{-}W, W\text{-}T, T\text{-}F, F\text{-}S, S\text{-}S\}$

$n(S) = 7$

$A = \{F\text{-}S, S\text{-}S\}$

$n(A) = 2$

$P(A) = \frac{n(A)}{n(S)} = \frac{2}{7}$

III

(29) $A \cap C = \{3\}$

$B \cap D = \{3, 5\}$

$(A \cap C) \times (B \cap D)$

$= \{(3,3)(3,5)\}$ —(1)

$(A \times B)$

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

$(C \times D)$

$= \{(3,1)(3,3)(3,5)(4,1)(4,3)(4,5)\}$

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

from (1) & (2) are equal

$\therefore (A \cap C) \times (B \cap D) = (A \times B) \cap (C \times D)$

Hence Proved.

(30) $2f(4) = 2(5(4)^2 - 1) = 2(80 - 1) = 79$

$f(8) = 3(8) - 4 = 24 - 4 = 20$

$2f(4) + f(8) = 2(79) + 20 = 158 + 20$

$= 178$

ii) $\frac{2(6(-2) + 1) - (3(6) - 4)}{(5(4^2) - 1) + (6(-2) + 1)}$

$= \frac{2(-11) - 4}{79 + (-11)} = \frac{-22 - 4}{79 - 11} = \frac{-36}{68} = \frac{-9}{17}$

(31) $t_1, t_2, t_3 \ldots\ \ t_7 = -1,\ t_{16} = 17$

$a + (7-1)d = -1,\ a + (16-1)d = 17$

$a + 6d = -1$ —(1), $a + 15d = 17$ —(2)

(1) & (2) $\Rightarrow 9d = 18$

$d = 2$

$d = 2$ in (1) $a + 12 = -1$

$a = -13$

$\therefore t_n = a + (n-1)d$

$\Rightarrow -13 + (n-1)2$

$\Rightarrow -13 + 2n - 2$

$\Rightarrow t_n = 2n - 15$

(32)

$$\begin{array}{r|rrrrr} & 1 & -4 & +4 & & \\ 1 & 1 & -8 & +m & +n & +16 \\ & 1 & & & & \\ 2\ \ -4 & & -8 & +m & & \\ & & -8 & +16 & & \\ & & (-) & (-) & & \\ 2\ -8\ +4 & & & (m-16) & +n & +16 \\ & & & 8 & -32 & +16 \\ & & & & 0 & \end{array}$$

$m-16=8$

$\boxed{m=24}$, $\boxed{n=-32}$

(33) Speed $= x$

Inc speed $= x+15$

Org. speed $= \frac{90}{x}$

hrs Increased $= \frac{90}{x+15}$

Diff. $= 30$ min $\frac{1}{2}$ hr

$\frac{90}{x} - \frac{90}{x+15} = \frac{1}{2}$

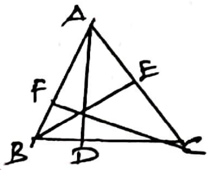
$2700 = x^2+15x$

$x^2+15x-2700=0$

$(x+60)(x-45)$

$x = -60, 45$

(34) by ABT thm



$\triangle ABC$ AD bis $\angle A$

$\frac{AB}{AC} = \frac{BD}{DC}$ —(1)

$\triangle ABC$ BE bis $\angle B$ $\frac{BC}{AB} = \frac{CE}{EA}$ —(2)

$\triangle ABC$ CF bis $\angle C$ $\frac{AC}{BC} = \frac{AF}{FB}$ —(3)

Multiply (1) (2) & (3) we get

$\frac{AB}{AC} \times \frac{BC}{AB} \times \frac{AC}{BC} = \frac{BD}{DC} \times \frac{CE}{EA} \times \frac{AF}{FB} = 1$

Hence Proved.

(35) $\frac{1}{2}$ {formula}

$= \frac{1}{2}\{88+60-15-24)-(30-55-48+24)\}$

$= \frac{1}{2}\{109+49\}$

$= \frac{1}{2}\{158\}$

$= 79$ sq.units

(36) (1) $\times 4 = 28x+12y = 40$

(2) $\times 3 = 15x-12y = 3$

$43x = 43$

$\boxed{x=1}$

$x=1$ in (1)

$7(1)+3y=10$

$3y = 10-7$

$\boxed{y=1}$

$\parallel$el $13x+5y+12=0$

$13x+5y+k=0$ —(3)

(1,1) Passing (3)

$13(1)+5(1)+k=0$

$18+k=0$

$\boxed{k=-18}$

$\therefore 13x+5y-18=0$

(37) $P = \operatorname{cosec}\theta + \cot\theta$ —(1)

$\operatorname{cosec}^2\theta + \cot^2\theta = 1$

$\operatorname{cosec}\theta - \cot\theta = \frac{1}{\operatorname{cosec}\theta + \cot\theta}$

$\operatorname{cosec}\theta - \cot\theta = \frac{1}{P}$ —(2)

(1) + (2) $\Rightarrow$

$2\operatorname{cosec}\theta = P + \frac{1}{P}$

$2\operatorname{cosec}\theta = \frac{P^2+1}{P}$ —(3)

(2) − (1) $\Rightarrow$

$2\cot\theta = P - \frac{1}{P}$

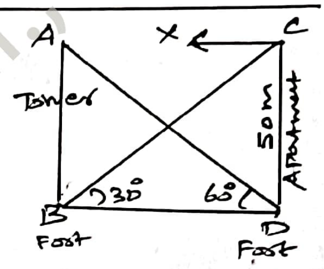
$2\cot\theta = \frac{P^2-1}{P}$ —(4)

$\frac{(4)}{(3)} \Rightarrow \frac{2\cot\theta}{2\operatorname{cosec}\theta} = \frac{P^2-1}{P} \times \frac{P}{P^2+1}$

$\cos\theta = \frac{P^2-1}{P^2+1}$

H.P.//

(38)



$\tan 30° = \frac{CD}{BD}$

$\frac{1}{\sqrt{3}} = \frac{50}{BD}$; $BD = 50\sqrt{3}$

$\tan 60° = \frac{AB}{BD}$

$\sqrt{3} = \frac{AB}{50\sqrt{3}}$

$AB = 50\sqrt{3}\sqrt{3}$

$AB = 150$ m.

$\therefore$ Height of Tower $= 150$ m.

It meets the norm of minimum height $= 120$ m.

(39) $h = 15$ cm, $r = 6$ cm. $V = \frac{22}{7} \times 6 \times 6 \times 15$

$r_1 = 3$, $h_1 = 9$

V of ice cone $=$ (V of cone + V of hemi cap)

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

$= \left(\frac{1}{3} \times \frac{22}{7} \times 3 \times 3 \times 9\right) + \left(\frac{2}{3} \times \frac{22}{7} \times 3 \times 3 \times 3\right)$

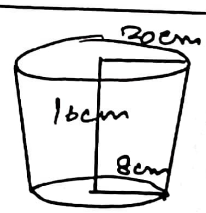
$= \frac{22}{7} \times 9(3+2)$

$= \frac{22}{7} \times 45$

No. of Icecream $= \dfrac{\frac{22}{7} \times 6 \times 6 \times 15}{\frac{22}{7} \times 45}$

$= 12$//

(40) $V = \frac{1}{3}\pi h(R^2+Rr+r^2)$



$= \frac{1}{3} \times \frac{22}{7} \times 16(20^2+20(8)+8^2)$

$= \frac{73216}{7} = \frac{10459.4}{1000} = 10.4594$ litres.

Cost $= 40 \times 10.459 = 418.36$ rupees.

(41) $S = \{HHH, HTH, THH, TTH, HHT, HTT, THT, TTT\}$

$n(S) = 8$

$A = \{HHH, HTH, THH, TTH, HHT, HTT, THT\}$ $n(A) = 7$

$P(A) = \frac{n(A)}{n(S)} = \frac{7}{8}$

$B = \{HHH, HTH, THH, HHT\}$ $n(B) = 4$ $P(B) = \frac{n(B)}{n(S)} = \frac{4}{8}$

$A \cap B = \{HHH, HTH, THH, HHT\}$ $n(A\cap B) = 4$ $P(A\cap B) = \frac{n(A\cap B)}{n(S)} = \frac{4}{8}$

$P(A\cup B) = P(A) + P(B) - P(A\cap B) = \frac{7}{8} + \frac{4}{8} - \frac{4}{8} = \frac{7}{8}$//

(42)

$$\text{Mean } \bar{x} = \frac{\Sigma x}{n}$$

$$= \frac{1+2+3+\cdots n}{n}$$

$$= \frac{n(n+1)}{2n}$$

$$V = \sigma^2 = \frac{\Sigma x^2}{n} - \left(\frac{\Sigma x}{n}\right)^2$$

$$= \left(\frac{n(n+1)(2n+1)}{6n}\right) - \left(\frac{n(n+1)}{2n}\right)^2$$

$$= \frac{2n^2+3n+1}{6} - \frac{n^2+2n+1}{4}$$

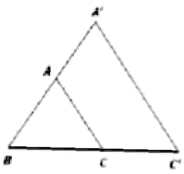
$$= \frac{4n^2+6n+2-3n^2-6n-3}{12}$$

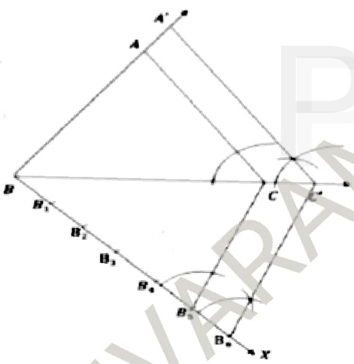
$$V = \frac{n^2-1}{12}$$

தீர்வு :-

தீர்வு. அளவு காரணி $\frac{6}{5} < 1$

உதவிப்படம்





$\Delta A'BC'$ என்பது நமக்குத் தேவையான வடிவொத்த முக்கோணம் ஆகும்.

(43)

Solution :

1. Table :

No. of participants (x)	2	4	6	8	10	12
Amount for each participants in Rs. (y)	180	90	60	45	36	30

2. Variation :

Indirect Variation

3. Equation :

$xy = k$

$xy = 2 \times 180 = 360$

$xy = 360$

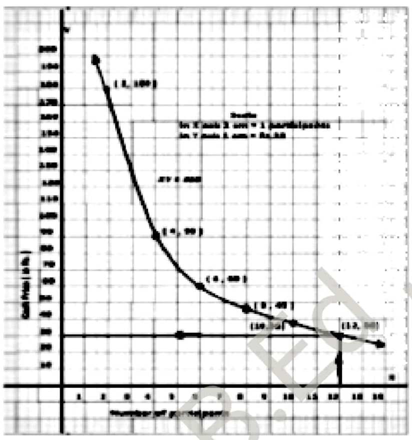
4. Points :

(2, 180), (4, 90), (6, 60), (8, 45), (10, 36), (12, 30)

5. Solution :

(i). Constant of Variation $k = 360$

(ii). Cash Price each participant will get if 12 participants participate = **Rs. 30**



Solution :

Prepare a table for $y = x^2 + 3x - 4$

x	-5	-4	-3	-2	-1	0	1	2
y	6	0	-4	-6	-6	-4	0	6

Now $y = x^2 + 3x - 4$

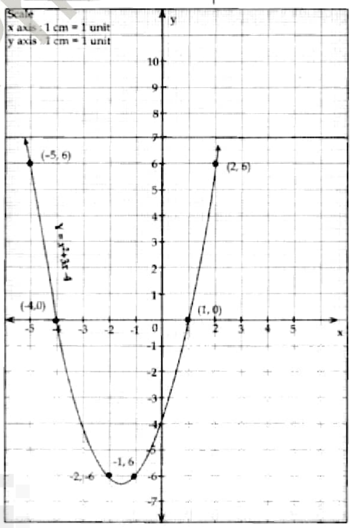
$0 = x^2 + 3x - 1$ (-)

$y = 0$

$y = 0$ is the straight line of x axis

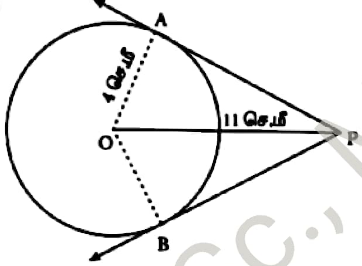
There fore, the solution for

$x^2 + 3x - 4 = 0$ is -4 and 1

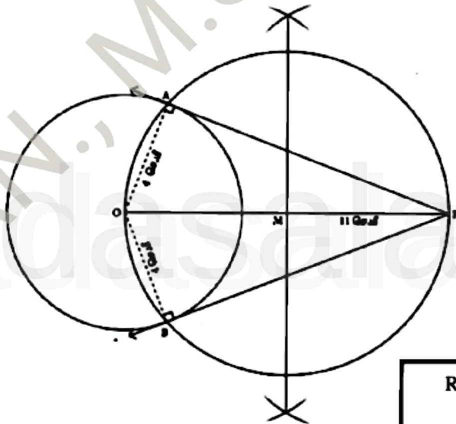


தீர்வு :

வட்டத்தின் ஆரம் = 4 செ.மீ



உதவிப்படம்



தொடுகோடுகளின் நீளங்கள் PA = PB = 10.2 செ.மீ

R. SIVARAMAN., M.Sc., M.Phill., B.Ed.,
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