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Serial No. of  
G. C. A. B.

ಒಟ್ಟು ಪ್ರಶ್ನೆಗಳ ಸಂಖ್ಯೆ : 58 ]

[ ಒಟ್ಟು ಮುದ್ರಿತ ಪುಟಗಳ ಸಂಖ್ಯೆ : 40

Total No. of Questions : 58 ]

[ Total No. of Printed Pages : 40

ಸಂಕೇತ ಸಂಖ್ಯೆ : **81-E**

ವಿಷಯ : ಗಣಿತ

Code No. : **81-E**

**Subject : MATHEMATICS**

( ಇಂಗ್ಲೀಷ್ ಭಾಷಾಂತರ / English Version )

ದಿನಾಂಕ : 17. 06. 2013 ]

[ Date : 17 06. 2013

ಸಮಯ : ಬೆಳಿಗ್ಗೆ 9-30 ರಿಂದ ಮಧ್ಯಾಹ್ನ 12-45 ರವರೆಗೆ ]

[ Time : 9-30 A.M. to 12-45 P.M.

ಪರಮಾವಧಿ ಅಂಕಗಳು : 100 ]

[ Max. Marks : 100

**FOR OFFICE USE ONLY**

G. No.	Marks	G. No.	Marks	G. No.	Marks	G. No.	Marks	G. No.	Marks
1.		14.		27.		40.		53.	
2.		15.		28.		41.		54.	
3.		16.		29.		42.		55.	
4.		17.		30.		43.		56.	
5.		18.		31.		44.		57.	
6.		19.		32.		45.		58.	
7.		20.		33.		46.		x	
8.		21.		34.		47.		x	
9.		22.		35.		48.		x	
10.		23.		36.		49.		x	
11.		24.		37.		50.		x	
12.		25.		38.		51.		x	
13.		26.		39.		52.		x	
<b>Total Marks</b>									
<b>Total Marks in words</b>					<b>Grand Total</b>				
1. ✓									
2. ✓					✓				
Signature of Evaluators			Registration No.		Signature of the Deputy Chief			Signature of the Room Invigilator	

*General Instructions :*

- i) The Question-cum-Answer Booklet consists of objective and subjective types of questions having 58 questions.
- ii) Space has been provided against each objective type question. You have to choose the correct choice and write the complete answer along with its alphabet in the space provided.
- iii) For subjective type questions enough space for each question has been provided. You have to answer the questions in the space.
- iv) Follow the instructions given against both the objective and subjective types of questions.
- v) Candidate should not write the answer with pencil. Answers written in pencil will not be evaluated. ( Except Graphs, Diagrams & Maps )
- vi) In case of Multiple Choice, Fill in the blanks and Matching questions, scratching / rewriting / marking is not permitted, thereby rendering to disqualification for evaluation.
- vii) Candidates have extra 15 minutes for reading the question paper.
- viii) **Space for Rough Work** has been printed and provided at the bottom of each page.

- I. *Four alternatives are given for each of the following questions / incomplete statements. Only one of them is correct or most appropriate. Choose the correct alternative and write the complete answer along with its alphabet in the space provided against each question.*  $20 \times 1 = 20$

1. If the universal set  $U = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$  and  $A = \{0, 1, 3, 5, 7\}$  then  $U - A$  is equal to
- (A)  $\{0, 2, 3, 4, 6, 8, 9\}$
  - (B)  $\{0, 2, 4, 6, 8\}$
  - (C)  $\{2, 4, 6, 8\}$
  - (D)  $\{2, 4, 6, 8, 9\}$ .

Ans. : \_\_\_\_\_

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( SPACE FOR ROUGH WORK )

2. If 2,  $1 + x$ , 10 are in Harmonic Progression, then the value of  $x$  is

- (A)  $\frac{1}{3}$  (B)  $\frac{7}{3}$   
(C)  $\frac{9}{3}$  (D) 10.

Ans. : \_\_\_\_\_

3. If  $A = [ 1 \ 2 \ 3 ]$  and  $B = \begin{bmatrix} 4 \\ 5 \\ 6 \end{bmatrix}$  then the order of  $BA$  is

- (A)  $1 \times 1$  (B)  $3 \times 3$   
(C)  $1 \times 3$  (D)  $3 \times 1$ .

Ans. : \_\_\_\_\_

4. The number of combinations of the letters of the word CONFUSE is

- (A) 1 (B) 8  
(C)  $8!$  (D) 336.

Ans. : \_\_\_\_\_

5. The L.C.M. of  $(8x^3 - 1)$  and  $(4x^2 + 2x + 1)$  is

- (A)  $8x^3 + 1$  (B)  $8x^3 - 1$   
(C)  $4x^2 + 2x + 1$  (D)  $2x - 1$ .

Ans. : \_\_\_\_\_

6. The average of three numbers is 5. If the sum of the first two numbers is 6, then the third number is

- (A) 5 (B) 9  
(C) 15 (D) 21.

Ans. : \_\_\_\_\_

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7.  $\sum_{a,b,c} a^2 + \sum_{a,b,c} 2ab$  is equal to

(A)  $a^2 + b^2 + c^2$

(B)  $(a + b)^2$

(C)  $(a + b + c)^2$

(D)  $a^2 + b - c + b^2 + c - a.$

Ans. : \_\_\_\_\_

8. If  $\sum_{a,b,c} a = 0$  then the value of  $\sum_{a,b,c} a^3$  is

(A) 0

(B) 1

(C)  $-3abc$

(D)  $3abc.$

Ans. : \_\_\_\_\_

9. If  $a + b + c = 0$  then the value of  $a - b - c$  is equal to

(A)  $-2a$

(B)  $2a$

(C)  $2b$

(D)  $2c.$

Ans. : \_\_\_\_\_

10. If  $a\sqrt{b} = \sqrt{128}$  and  $a = 8$  then  $b$  is equal to

(A)  $\sqrt{2}$

(B) 2

(C)  $\sqrt{64}$

(D) 128.

Ans. : \_\_\_\_\_

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11. One pair of like surds from the following is

- (A)  $\sqrt{2}$  ,  $\sqrt{8}$  (B)  $\sqrt{2}$  ,  $\sqrt{3}$   
 (C)  $\sqrt[3]{2}$  ,  $\sqrt{2}$  (D)  $4\sqrt{3}$  ,  $\sqrt[3]{4}$

Ans. : \_\_\_\_\_

12. The equation having the roots 1 and - 1 is

- (A)  $x^2 - x - 1 = 0$  (B)  $x^2 + 1 = 0$   
 (C)  $x^2 = 1$  (D)  $x^2 + x + 1 = 0$

Ans. : \_\_\_\_\_

13. The value of the discriminant of the equation  $4x^2 - 4x + 1 = 0$  is

- (A) - 8 (B) - 12  
 (C) 32 (D) 0.

Ans. : \_\_\_\_\_

14. The product of  $5 \otimes_{11} 10$  is

- (A) 6 (B) 50  
 (C) 55 (D) 110.

Ans. : \_\_\_\_\_

15. The sum of  $(3 \oplus_7 6) \oplus_7 4$  is

- (A) 16 (B) 13  
 (C) 7 (D) 6.

Ans. : \_\_\_\_\_

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16.  $\Delta ABC \parallel \Delta DEF$ . If  $\hat{A} = \hat{D}$  and  $\hat{B} = \hat{E}$  then  $\frac{\text{Area of } \Delta ABC}{\text{Area of } \Delta DEF}$  is equal to

(A)  $\frac{AC^2}{DF^2}$

(B)  $\frac{AB^2}{DF^2}$

(C)  $\frac{AC^2}{EF^2}$

(D)  $\frac{BC^2}{DE^2}$ .

Ans. : \_\_\_\_\_

17. The diagonal of a square is  $d$  units. Then the area of the square is

(A)  $\frac{d}{\sqrt{2}}$

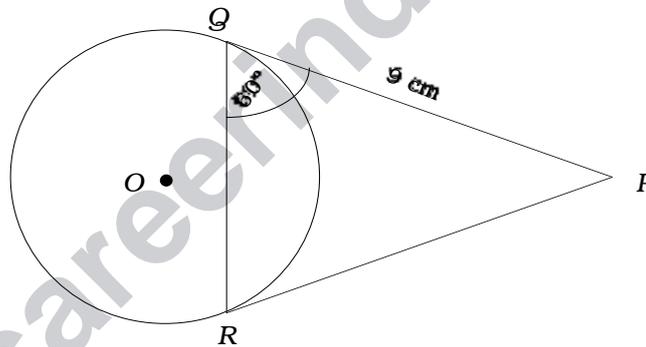
(B)  $\frac{d^2}{\sqrt{2}}$

(C)  $\frac{d^2}{2}$

(D)  $\frac{2}{d^2}$ .

Ans. : \_\_\_\_\_

18. Tangents  $PQ$  and  $PR$  are drawn to a circle from an external point  $P$ . If  $PQ = 9$  cm and  $\hat{PQR} = 60^\circ$ , then the length of the chord  $QR$  is,



(A) 4.5 cm

(B) 6 cm

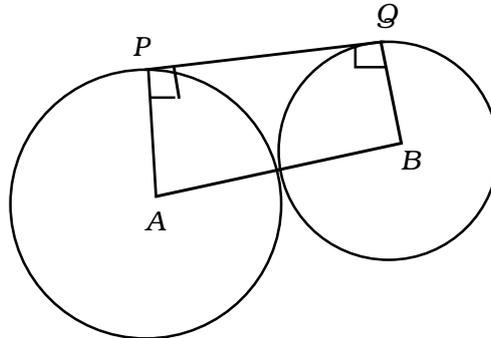
(C) 9 cm

(D) 18 cm.

Ans. : \_\_\_\_\_

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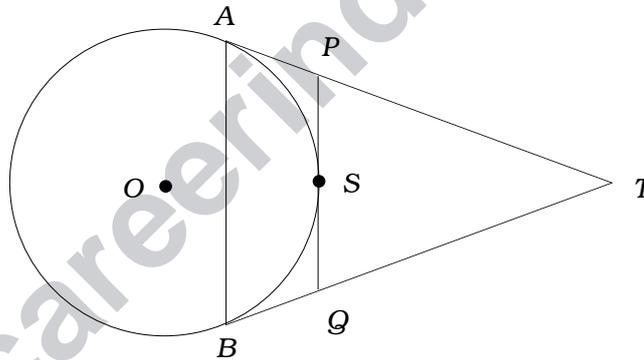
19. Two circles of radii 8 cm and 5 cm with their centres  $A$  and  $B$  touch each other externally as shown in the figure below. The length of direct common tangent  $PQ$  is



- (A)  $16\sqrt{10}$  cm                      (B)  $4\sqrt{10}$  cm  
 (C)  $10\sqrt{16}$  cm                      (D)  $2\sqrt{10}$  cm.

Ans. : \_\_\_\_\_

20. In the given figure,  $TA$  and  $TB$  are tangents drawn from an external point  $T$ .  $PQ$  is another tangent at  $S$ . If the perimeter of  $\Delta PTQ$  is 20 cm, then the length of  $AT$  is



- (A) 8 cm                                      (B) 10 cm  
 (C) 16 cm                                  (D) 20 cm.

Ans. : \_\_\_\_\_

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81-E

8

II. Fill in the blanks with suitable answers :

 $10 \times 1 = 10$ 21. If  $A$  and  $B$  are non-empty sets such that  $A - B = A$  then  $A \cap B = \dots\dots\dots$ 

Ans. : \_\_\_\_\_

22. If  $(AB)^\prime = \begin{bmatrix} 2 & 3 \\ 5 & 6 \end{bmatrix}$  then  $B^\prime A^\prime = \dots\dots\dots$ 

Ans. : \_\_\_\_\_

23. The value of  ${}^5C_0$  is  $\dots\dots\dots$ 

Ans. : \_\_\_\_\_

24. Conjugate of  $a\sqrt{b} + c$  is  $\dots\dots\dots$ 

Ans. : \_\_\_\_\_

25. The sum of the roots of the equation  $x^2 + 5x - 9 = 0$  is  $\dots\dots\dots$ 

Ans. : \_\_\_\_\_

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( SPACE FOR ROUGH WORK )

26. The standard form of the quadratic equation  $x^2 = 3x + 5$  is .....

Ans. : \_\_\_\_\_

27. Circles having the same centre but different radii are called .....

Ans. : \_\_\_\_\_

28. A straight line drawn parallel to a side of a triangle, divides the other two sides .....

Ans. : \_\_\_\_\_

29. The formula to calculate surface area of a sphere is, .....

Ans. : \_\_\_\_\_

30. The shape of each face of an octahedron is .....

Ans. : \_\_\_\_\_

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- III. 31. There are 5 terms in a Geometric progression. If the third term is 4, find the product of its terms. 2

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32. In a geometric progression the first term is 3, common ratio is 2. Find the sum of the first six terms using suitable formula. 2

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12

33. The Arithmetic Mean and Harmonic Mean of two numbers are 8 and 5 respectively. Find their Geometric Mean. 2

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34. If  $A = \begin{bmatrix} 2 & 5 \\ -1 & 0 \end{bmatrix}$  and  $B = \begin{bmatrix} 3 & 2 \\ -2 & 4 \end{bmatrix}$ , find  $X$  in the equation  $A + \frac{1}{2}X = B$ . 2

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81-E

14

35. (a) State Fundamental Counting Principle.  
(b) Write the meaning of  ${}^n P_r$ .

2

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36. Find  $n$  if  ${}^{25}C_{n+5} = {}^{25}C_{2n-1}$ .

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16

37. The H.C.F. and L.C.M. of two expressions are  $(m - 7)$  and  $(m^3 - 10m^2 + 11m + 70)$  respectively. If one of the expressions is  $(m^2 - 12m + 35)$ , find the other expression.

2

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38. Rationalise the denominator and simplify the following :

2

$$\frac{\sqrt{5} + \sqrt{3}}{\sqrt{5} - \sqrt{3}} .$$

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**81-E**

18

39. If one root of the equation  $x^2 + px + q = 0$  is 3 times the other, prove that

$$3p^2 = 16q.$$

2

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40. What is a pure quadratic equation ? Give one example.

2

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**81-E**

20

41. Solve the equation  $p^2 + 1 = 8p$  using the formula.

2

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42. If  $m$  and  $n$  are the roots of the equation  $x^2 - 2x + 3 = 0$ , find the value of

$$\frac{1}{m^2} + \frac{1}{n^2} .$$

2

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81-E

22

43. Draw a circle of radius 3 cm. Construct two tangents to it such that angle between them is  $50^\circ$ .

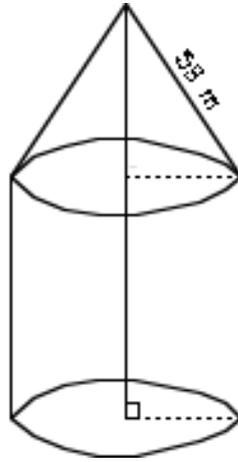
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44. A tent is in cylindrical shape to a height of 3 m and conical above it, as shown below. If its diameter is 105 m and slant height of the cone is 53 m, calculate the total surface area of the canvas required. 2




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81-E

24

45. Find the volume of the cone having radius 7 cm and height 18 cm.

2

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46. Draw a plan of the field from the records of surveyor's field book as given below :

2

[ Scale : 25 m = 1 cm ]

	Metres to D	
	300	
	200	100 to C
To E 75	150	75 to B
	From A	

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**81-E**

26

47. a) What is meant by traversibility of a network ?
- b) Mention the two conditions for the traversibility of a network. 2

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48. Draw the network for the given matrix.

2

$$\begin{bmatrix} 2 & 1 & 1 \\ 1 & 2 & 1 \\ 1 & 1 & 2 \end{bmatrix}$$

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81-E

28

- IV. 49. There are 60 students in a class, every student learns at least one of the subjects Kannada or English. 45 students offer Kannada and 30 English. How many students offer both the subjects ? How many offer only English ? 3

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50. The following frequency distribution shows the daily wages of 15 workers. Find their arithmetic mean and standard deviation. 3

<b>Wages ( in Rs. ) ( CI )</b>	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80
<b>No. of workers ( f )</b>	2	3	5	3	2

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51. Find the L.C.M. of  $m^3 - 3m^2 - 10m + 24$  and  $m^3 - 2m^2 - 9m + 18$  by division method. 3

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81-E

32

52. If  $a + b + c = 0$ , prove that

$$\frac{a^2}{a^2 - bc} + \frac{b^2}{b^2 - ca} + \frac{c^2}{c^2 - ab} = 2.$$

3

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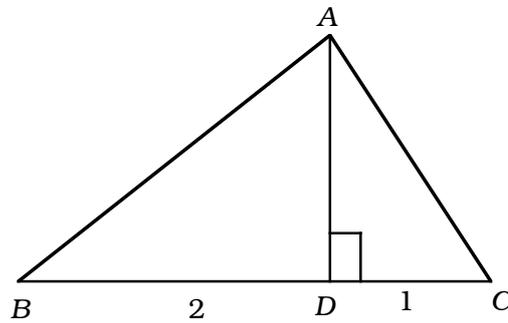
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53. In  $\Delta ABC$ ,  $AD$  is the altitude drawn from  $A$  to  $BC$  and  $DB : CD = 2 : 1$ .

Prove that  $BC^2 = 3 ( AB^2 - AC^2 )$  .

3



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81-E

34

54. If two circles touch each other externally, prove that the point of contact and centres of circles are collinear. 3

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- V. 55. An arithmetic progression consists of three terms whose sum is 15 and sum of the squares of extremes is 58. Find the terms of progression. 4

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**81-E**

36

56. Two circles of radii 5 cm and 2 cm have their centres 10 cm apart. Construct direct common tangents to them. Measure their length and mention the length of each direct common tangent. 4

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57. Prove that the areas of similar triangles are proportional to the squares of their corresponding sides.

4

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38

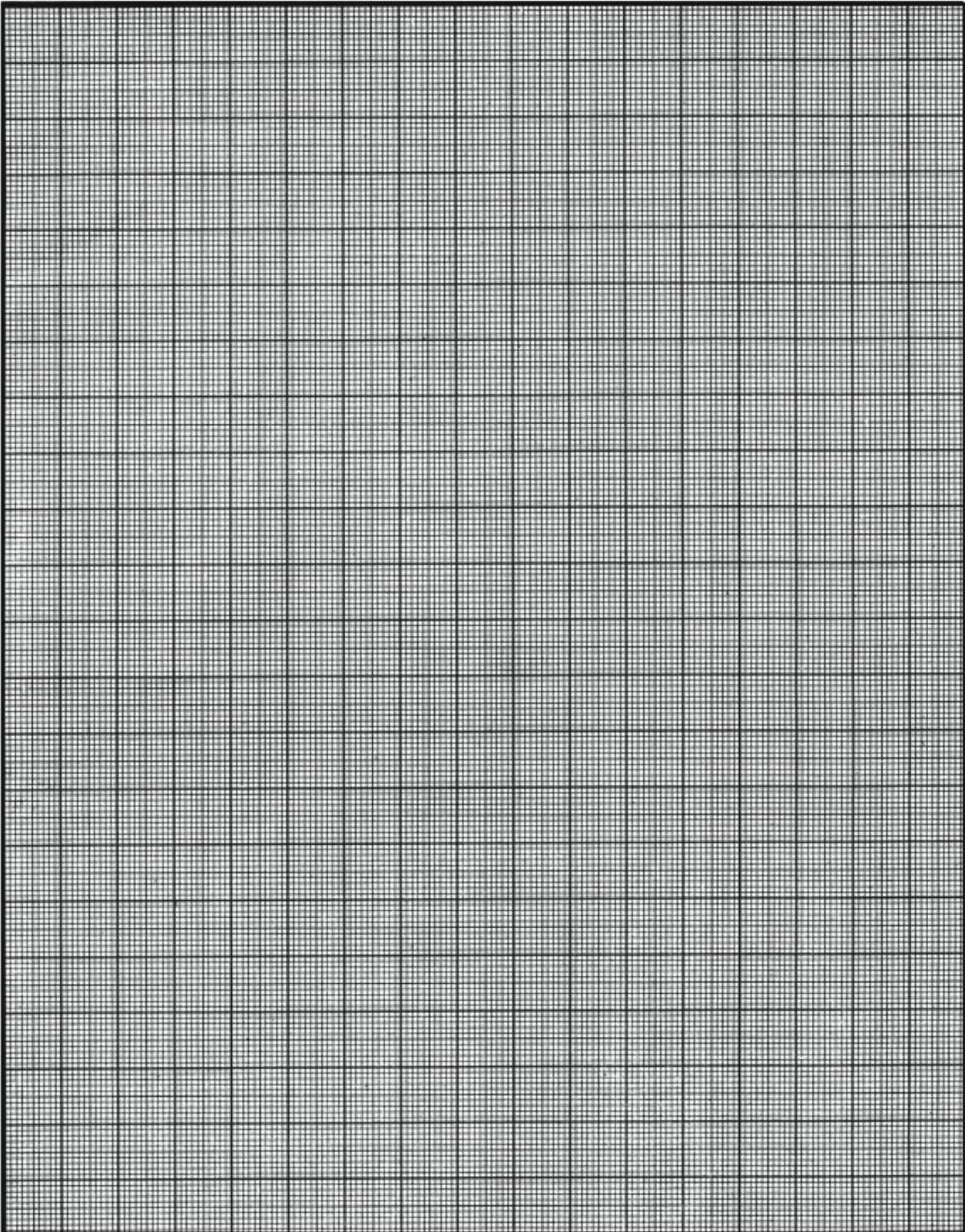
58. Solve graphically :  $x^2 - x - 2 = 0$ .

4

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