

Roll  
No.

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Serial No. of  
Q. C. A. B.

ಒಟ್ಟು ಪ್ರಶ್ನೆಗಳ ಸಂಖ್ಯೆ : 58 ]

[ ಒಟ್ಟು ಮುದ್ರಿತ ಪುಟಗಳ ಸಂಖ್ಯೆ : 32

Total No. of Questions : 58 ]

[ Total No. of Printed Pages : 32

ಸಂಕೇತ ಸಂಖ್ಯೆ : **81-E**

ವಿಷಯ : ಗಣಿತ

Code No. : **81-E**

**Subject : MATHEMATICS**

(ಇಂಗ್ಲೀಷ್ ಭಾಷಾಂತರ / English Version )

ದಿನಾಂಕ : 05. 04. 2011 ]

[ Date : 05. 04. 2011

ಸಮಯ : ಬೆಳಿಗ್ಗೆ 10-30 ರಿಂದ ಮಧ್ಯಾಹ್ನ 1-45 ರವರೆಗೆ ]

[ Time : 10-30 A.M. to 1-45 P.M.

ಪರಮಾವಧಿ ಅಂಕಗಳು : 100 ]

[ Max. Marks : 100

**FOR OFFICE USE ONLY**

Q. No.	Marks	Q. No.	Marks	Q. No.	Marks	Q. No.	Marks	Q. 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.		×	
8.		21.		34.		47.		×	
9.		22.		35.		48.		×	
10.		23.		36.		49.		×	
11.		24.		37.		50.		×	
12.		25.		38.		51.		×	
13.		26.		39.		52.		×	
<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 × 1 = 20

1. If set  $A = \{ 2, 3, 4, 5 \}$  and set  $B = \{ 4, 5 \}$  then which of the following is a null set ?

(A)  $A - B$

(B)  $B - A$

(C)  $A \cup B$

(D)  $A \cap B$ .

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

---

( SPACE FOR ROUGH WORK )

2. The Harmonic mean of  $P$  and  $Q$  is

(A)  $\frac{2(P+Q)}{PQ}$

(B)  $\frac{2PQ}{P+Q}$

(C)  $\frac{2(P+Q)}{P-Q}$

(D)  $\frac{2P+Q}{PQ}$  .

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

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

(A)  $\begin{bmatrix} 2 & 5 \\ 3 & 6 \end{bmatrix}$

(B)  $\begin{bmatrix} 2 & 3 \\ 6 & 5 \end{bmatrix}$

(C)  $\begin{bmatrix} 2 & 3 \\ 5 & 6 \end{bmatrix}$

(D)  $\begin{bmatrix} 5 & 6 \\ 2 & 3 \end{bmatrix}$  .

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

4. Which one of the following is a correct relationship ?

(A)  ${}^n P_r = {}^n C_r \infty \underline{r}$

(B)  ${}^n C_r = {}^n P_r \infty \underline{r}$

(C)  ${}^n P_r = {}^n C_r \div \underline{r}$

(D)  ${}^n C_r = {}^n P_r \div \underline{r}$  .

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

5. Coefficients of variation of price of four foodgrains namely rice, wheat, jowar and ragi are 10, 11, 13 and 9 respectively. Then which foodgrain's rate is more consistent ?

(A) Rice

(B) Wheat

(C) Jowar

(D) Ragi.

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

( SPACE FOR ROUGH WORK )

81-E

4

6. H.C.F. of  $(m^2 - n^2)$  and  $(m + n)^2$  is

(A)  $(m + n)$

(B)  $(m - n)$

(C)  $(m^2 - n^2)$

(D)  $(m + n)^2$  .

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

7. Which one of the following is equal to the relation

$$\sum_{a,b,c} a^2 + \sum_{a,b,c} 2ab ?$$

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

(B)  $(a + b)^3$

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

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

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

8. When  $\sum_{x,y,z} (x + y)$  is expanded and simplified, we get

(A)  $x + y + z$

(B)  $2x + 2y + 2z$

(C)  $3x + 3y + 3z$

(D)  $3xyz$ .

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

9. The Algebraic expression having factors  $(a + b)$  and  $(a^2 + b^2 - ab)$  is

(A)  $a^3 + b^3$

(B)  $a^3 - b^3$

(C)  $(a + b)^3$

(D)  $(a - b)^3$  .

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

---

( SPACE FOR ROUGH WORK )

10. If  $a + b + c = 0$ , the value of  $(b + c)(c + a)$  is

(A)  $bc$

(B)  $ca$

(C)  $ab$

(D)  $abc$ .

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

11. When  $2\sqrt{x} - \sqrt{y}$  is subtracted from  $5\sqrt{x} + 2\sqrt{y}$ , the answer is

(A)  $3\sqrt{x} + 3\sqrt{y}$

(B)  $3\sqrt{x} - \sqrt{y}$

(C)  $3\sqrt{x} + \sqrt{y}$

(D)  $3\sqrt{x} - 3\sqrt{y}$ .

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

12. An example for pure quadratic equation is

(A)  $2x^2 - x = 0$

(B)  $5x = 3$

(C)  $4x = 9x^2$

(D)  $2x^2 = 16$ .

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

13. If the one of the roots of the equation  $x^2 - 5x = 0$  is zero, then the other root is

(A) 0

(B) -5

(C) +5

(D)  $\pm 5$ .

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

---

( SPACE FOR ROUGH WORK )

14. If  $4a = \frac{36}{a}$  the value of  $a$  is

(A)  $\pm 9$

(B)  $\pm 3$

(C)  $+ 3$

(D)  $- 3.$

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

15. If  $a$  and  $b$  are the roots of the equation  $x^2 - 5x + 7 = 0$ , then value of  $ab ( a + b )$  is

(A) 5

(B) 25

(C) 35

(D) 49.

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

16. Which one of the following groups is a Pythagorean triplet ?

(A) 3, 4, 5

(B) 1, 2, 3

(C) 2, 3, 4

(D) 9, 10, 14.

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

17. Formula for total surface area of a solid hemisphere is

(A)  $4\pi r^2$

(B)  $2\pi r^2$

(C)  $3\pi r^2$

(D)  $\pi r^2$  .

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

18. Area of the base of a circular cylinder is 154 sq.cm and height is 10 cm. The volume of cylinder is

(A) 1540 c.c.

(B) 15.4 c.c.

(C) 164 c.c.

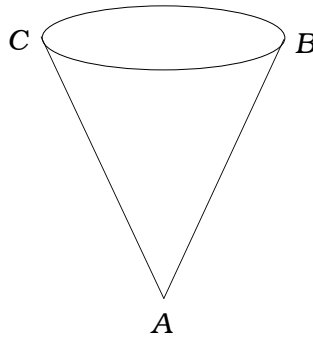
(D) 144 c.c.

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

---

( SPACE FOR ROUGH WORK )

19. The sum of the order of nodes in the given network is



(A) 3

(B) 4

(C) 8

(D) 10.

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

20. The numbers of vertices and edges respectively in a Hexahedron are

(A) 8, 12

(B) 12, 8

(C) 6, 8

(D) 8, 6.

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

II. Complete the following statements by filling in the blanks :

10 × 1 = 10

21. If  $A$  and  $B$  are disjoint sets then  $(A \cap B)$  becomes a ..... set.

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

22. If  $A$  is non-zero matrix, then  $(A')' = \dots\dots\dots$

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

23. The value of  ${}^n P_0 = \dots\dots\dots$

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

24. The conjugate of  $a\sqrt{x} + b\sqrt{y}$  is .....

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

---

( SPACE FOR ROUGH WORK )

25. The standard form of pure quadratic equation is .....

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

26. If  $m$  and  $n$  are the roots of the quadratic equation  $ax^2 + bx + c = 0$ , the sum of the roots  $m + n$  is .....

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

27. Two circles of radii  $R$  and  $r$  units, touch externally. The formula for the distance between the centres,  $d =$  .....

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

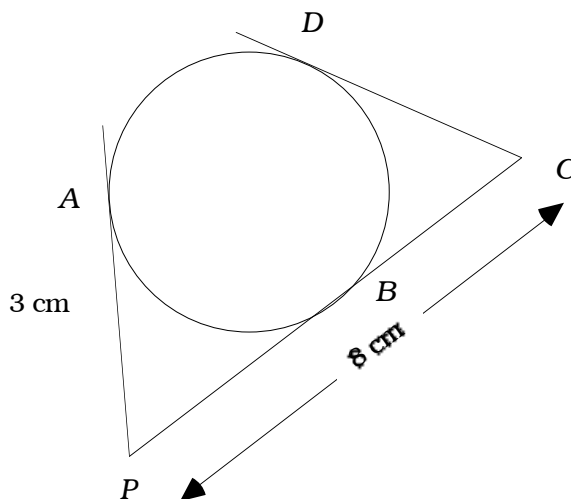
28. Formula for curved surface area of a cylinder is .....

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

29. The Euler's formula for graph is .....

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

30. In the following figure if  $AP = 3$  cm and  $PC = 8$  cm, length of the tangent  $CD$  is .....



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

---

( SPACE FOR ROUGH WORK )



III. Solve the following problems in the space provided :

$18 \times 2 = 36$

31. If  $\sum n = 210$ , find the value of  $n$ .

32. A person deposits Rs. 1,000 in the first month. Then every month he increases the monthly deposit by Rs. 60. Use the principle of progression and calculate his total investment at the end of two years.

---

( SPACE FOR ROUGH WORK )

33. If A.M. and H.M. of two numbers are 10 and  $6\cdot4$  respectively, find Geometric mean.

34. If  $A = \begin{bmatrix} 3 & -2 \\ 4 & 2 \end{bmatrix}$ , show that  $A + A'$  is a symmetric matrix.

---

( SPACE FOR ROUGH WORK )

35. If  $5^n P_3 = 4^{(n+1)} P_3$ , find the value of  $n$ .

36. A school has 8 teachers. How many committees of 5 can be formed ?

---

( SPACE FOR ROUGH WORK )

**81-E**

12

37. Find the H.C.F. of  $m^3 + 2m^2 + 2m + 1$  and  $m^2 + 2m + 1$ , by division method.

38.  $2(a^2 + b^2) = (a + b)^2$ , show that  $a = b$ .

---

( SPACE FOR ROUGH WORK )

39. Solve the equation by using formula

$$x^2 - 5x + 6 = 0.$$

40. The perimeter of a rectangular field is 54 metres and its area is 180 sq.m. Find the length and breadth of this field.

---

( SPACE FOR ROUGH WORK )

41. For what values of  $m$  the roots of the equation  $x^2 + mx + 4 = 0$  are equal ?

42. If  $\mathcal{Q} = \{ 0, 2, 4, 6 \}$  under  $( \approx \text{ mod } 10 )$ , construct a Cayley's table.

---

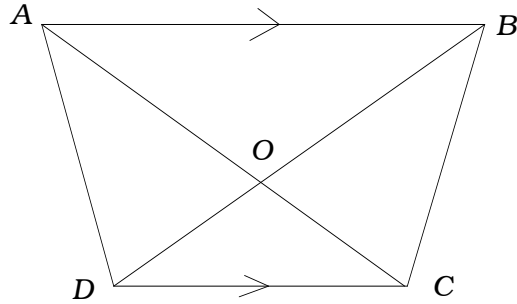
( SPACE FOR ROUGH WORK )

43. Construct tangents to a circle of radius 3 cm from a point 7 cm away from the centre.

---

( SPACE FOR ROUGH WORK )

44. A trapezium  $ABCD$  has its sides  $AB \parallel CD$  and its diagonals intersect at  $O$ . If side  $AB$  is twice the side  $CD$ , find the ratio of the area of triangle  $AOB$  to the area of triangle  $COD$ .

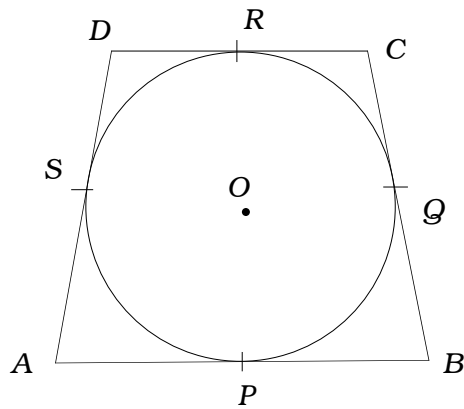


---

( SPACE FOR ROUGH WORK )



45. In the figure, the sides of a quadrilateral  $ABCD$  are tangents to the circle with centre  $O$ . Show that  $AB + CD = AD + BC$ .



---

( SPACE FOR ROUGH WORK )

**81-E**

18

46. The radius of a cone is 7 cm and slant height is 10 cm. Find the total surface area of the cone.

---

( SPACE FOR ROUGH WORK )

47. Draw a plan for the recordings from the surveyor's field book given below.

( Scale : 20 m = 1 cm )

	( Metres ) To C	
	220	
To D 100	180 H	
	120 G	100 to B
To E 140	80 F	
	From A	

---

( SPACE FOR ROUGH WORK )

48. Draw the graph for the matrix

$$\begin{bmatrix} 0 & 2 & 2 \\ 2 & 0 & 1 \\ 2 & 1 & 0 \end{bmatrix}$$

---

( SPACE FOR ROUGH WORK )

- IV. 49. (a) In a class of 60 students, everyone should select Mathematics or Science or both. If 45 students select Mathematics, 30 students select Science, how many students did select both the subjects ?
- (b) Draw a Venn diagram.

3

---

( SPACE FOR ROUGH WORK )

50. Calculate the Arithmetic mean and Standard deviation for the given frequency distribution :

3

<b><i>Class-interval</i></b>	<b><i>Frequency</i></b>
1 – 5	2
6 – 10	3
11 – 15	4
16 – 20	1

$$N = 10$$

---

( SPACE FOR ROUGH WORK )

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

3

---

( SPACE FOR ROUGH WORK )

52. Rationalise the denominator and simplify :

3

$$\frac{3\sqrt{2}}{\sqrt{6}-\sqrt{3}} + \frac{4\sqrt{3}}{\sqrt{6}+\sqrt{2}}$$

---

( SPACE FOR ROUGH WORK )



53. The height of an equilateral triangle is  $5\sqrt{3}$  cm. Find its perimeter.

3

---

( SPACE FOR ROUGH WORK )

54. Prove that the tangents drawn to a circle from an external point are

(i) equal

(ii) equally inclined to the line joining the external point and the centre.

3

---

( SPACE FOR ROUGH WORK )

- V. 55. The sum of three numbers of a G.P. is 57 and their product is 343. Find the numbers. 4

---

( SPACE FOR ROUGH WORK )

56. Draw two circles of radii 4 cm and 2 cm with their centres 10 cm apart. Draw the transverse common tangent ( T.C.T. ) to them and measure the length of the tangent. 4

---

**( SPACE FOR ROUGH WORK )**

57. Prove that if two triangles are equiangular, then their corresponding sides are proportional.

4

---

( SPACE FOR ROUGH WORK )

**81-E**

30

58. Draw the graphs of  $y = x^2$  and  $y = 2x + 3$  and hence solve the equation

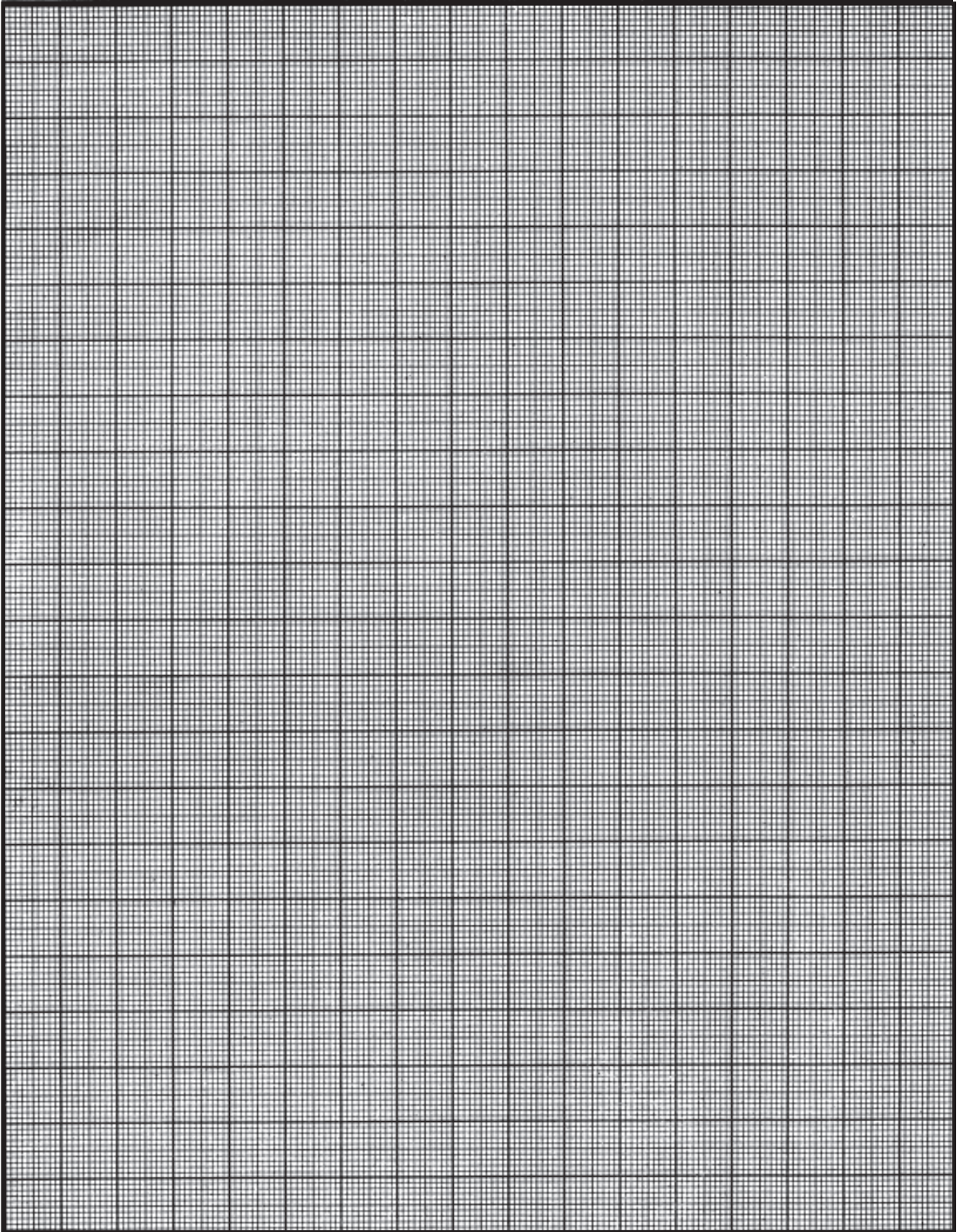
$$x^2 - 2x - 3 = 0.$$

4

---

( SPACE FOR ROUGH WORK )







---

( SPACE FOR ROUGH WORK )