

ALGEBRAIC IDENTITY

OBJECTIVE :

To verify the algebraic identity :

$$(a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$$

MATERIALS REQUIRED :

- * White Paper.
- * Colour Papers.
- * Glue.

PROCEDURE :

- Cut out a square of side $a = 4 \text{ cm}$ from a coloured paper. ('RED')
- Cut out a square of side $b = 3 \text{ cm}$ from a coloured paper. (GREEN).
- Cut out a square of side $c = 2 \text{ cm}$ from a coloured paper. (BLUE)

- Cut out two rectangles of dimensions $a \times b$, two rectangles of dimensions $b \times c$ and two rectangles of dimensions $c \times a$ square units from a coloured paper.
- Arrange the squares and rectangles on the white paper.

OBSERVATION :

⇒ On actual measurement,

$$a = 4 \quad ; \quad b = 3 \quad ; \quad c = 2$$

So,

$$a^2 = 16 \quad ; \quad b^2 = 9 \quad ; \quad c^2 = 4$$

$$ab = 12 \quad ; \quad bc = 6 \quad ; \quad ca = 8$$

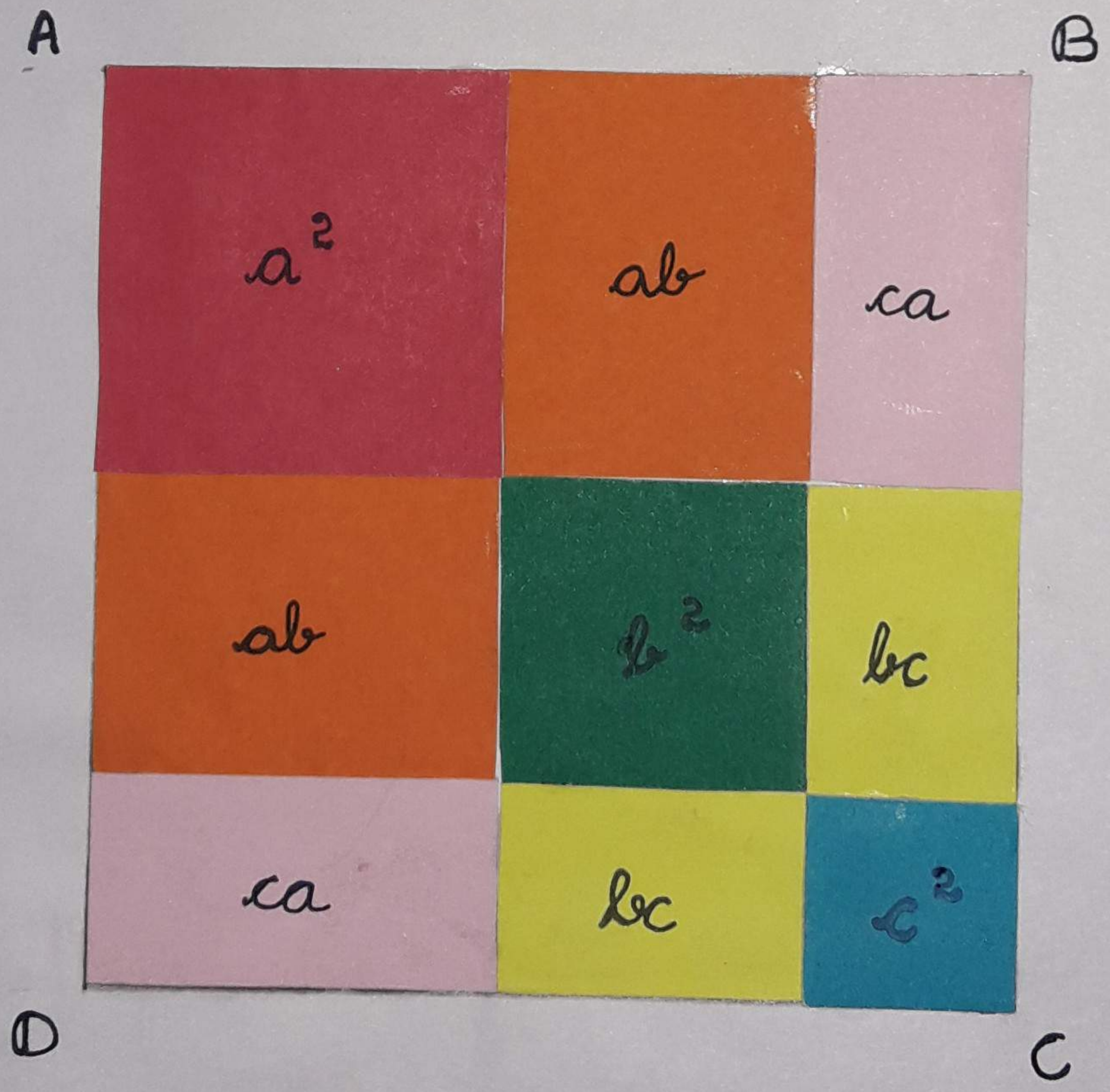
$$a+b+c = 9 \quad ; \quad (a+b+c)^2 = 81$$

RESULT :

Therefore,

$$(a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$$

is verified.



EXPERIMENT - 3

ANGLE SUM PROPERTY OF A QUADRILATERAL

OBJECTIVE :

- > To verify experimentally that the sum of the angles of a quadrilateral is 360° .

MATERIALS REQUIRED :

- * White Paper.
- * Coloured drawing sheet.
- * Geometry Box
- * Sketch Pens.
- * Tracing Paper.

PROCEDURE :

- Cut out a quadrilateral ABCD from a coloured drawing sheet and paste it on the white paper.
- Make cut-outs of all the four angles of the quadrilateral with the help of

a tracing paper.

- Arrange the four cut-outs angles at a point O' to form a circle.

OBSERVATION :

$$\rightarrow m \angle A = \quad ; \quad m \angle B =$$

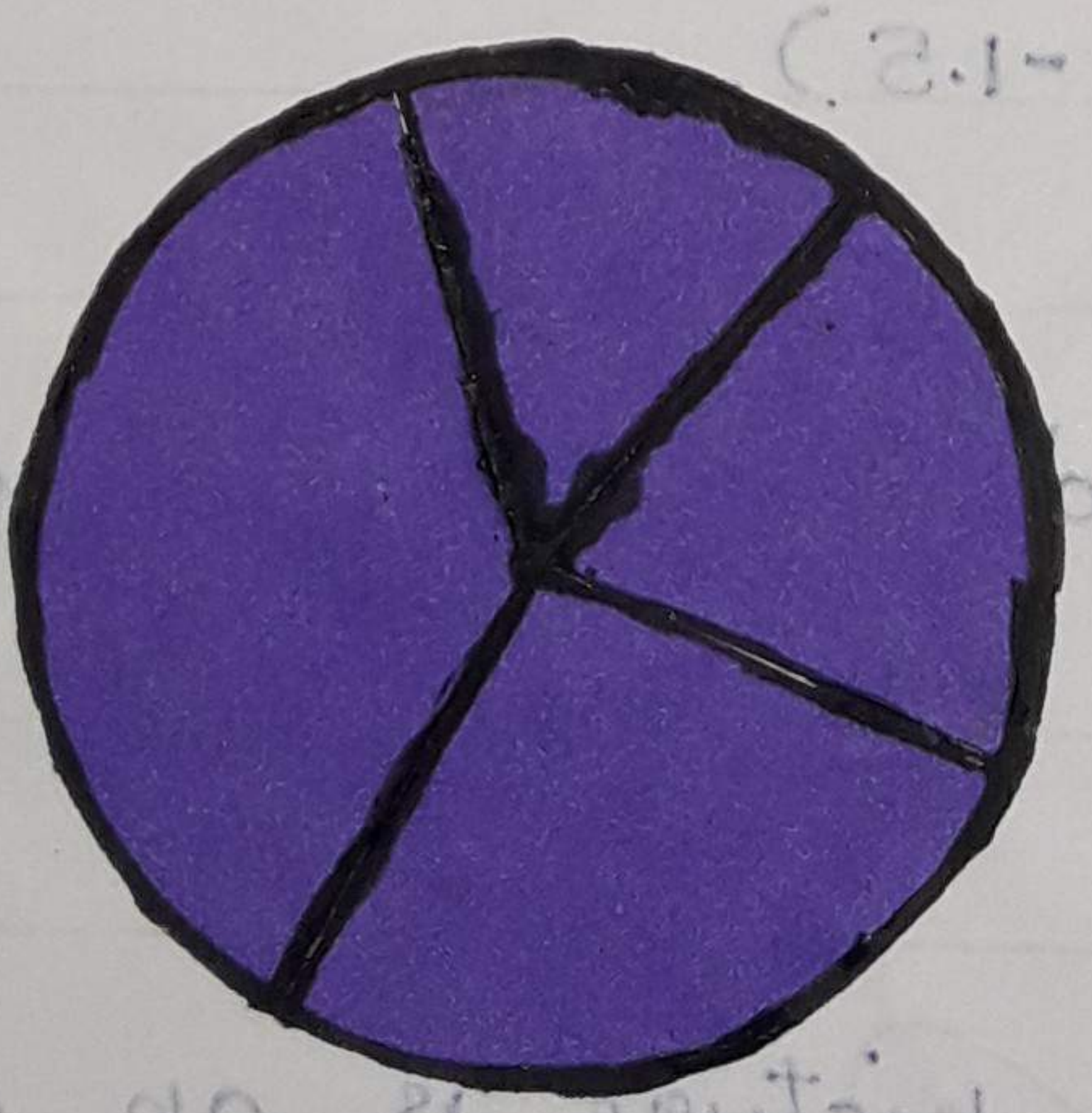
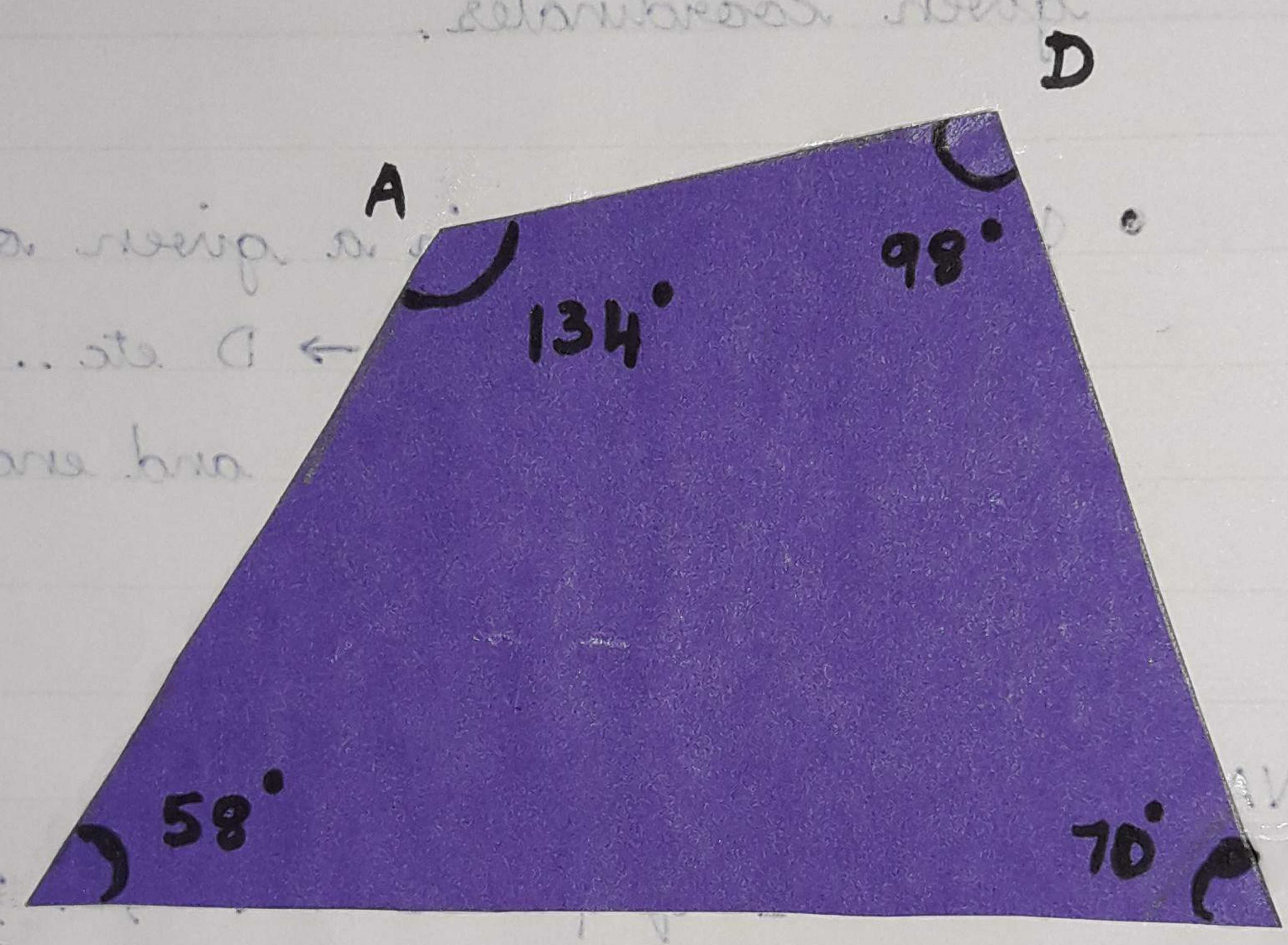
$$\rightarrow m \angle C = \quad ; \quad m \angle D =$$

$$\text{Sum } [\angle A + \angle B + \angle C + \angle D] = 360^\circ$$

RESULT :

\Rightarrow Hence, the angle sum property of a quadrilateral is verified.

Plot the points A, B, C etc... with the given coordinates.



RESULT :

The hidden picture is an aeroplane.

CURVED SURFACE AREA OF A CYLINDER

OBJECTIVE :

➤ To find a formula for the Curved Surface Area of a right circular cylinder, experimentally.

MATERIALS REQUIRED :

- * Coloured chart paper.
- * Cellotape.
- * Ruler.

PROCEDURE :

- Take a rectangular chart paper of length 4 cm and breadth 3 cm.
- Fold this paper along its breadth and join the two ends by using cellotape and obtain a cylinder.

OBSERVATION :

On actual measurement ;

$$\text{circumference } l = 4 \text{ cm}, \quad \text{height } b = 3 \text{ cm}.$$

$$2\pi r = l \Rightarrow$$

$$2 \times \frac{22}{7} \times r = 4.$$

$$r = \frac{4 \times 7}{2 \times 22}$$

$$r = \frac{7}{11} \text{ cm}$$

$$h = b = 3 \text{ cm}$$

$$\left. \begin{array}{l} \text{Area of the rectangular} \\ \text{paper} \end{array} \right\} = lb$$
$$= 4 \times 3$$
$$= 12 \text{ cm}^2$$

$$\left. \begin{array}{l} \text{Curved surface area of} \\ \text{the cylinder} \end{array} \right\} = \text{Area of the} \\ \text{rectangular paper.}$$

$$= lb.$$

$$= 2\pi r \times h$$

$$= 2 \times \frac{22^2}{7} \times \frac{7}{11} \times 3$$

$$= \underline{\underline{12 \text{ cm}^2}}$$

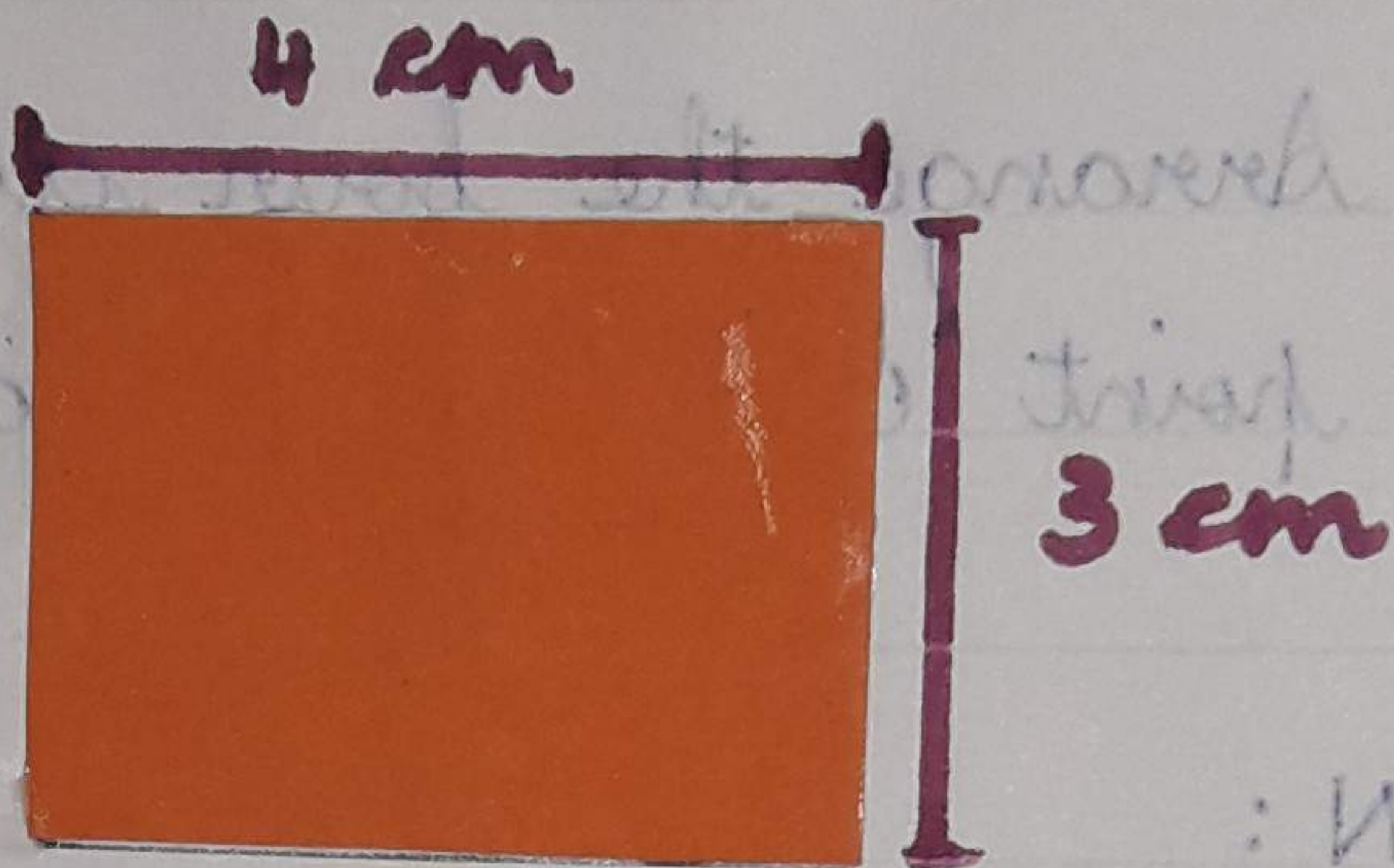
RESULT :

⇒ Hence, the formula for the curved surface area of a right circular cylinder is derived.

a tracing paper

a to explain this - the sum of the angles

Rectangle :



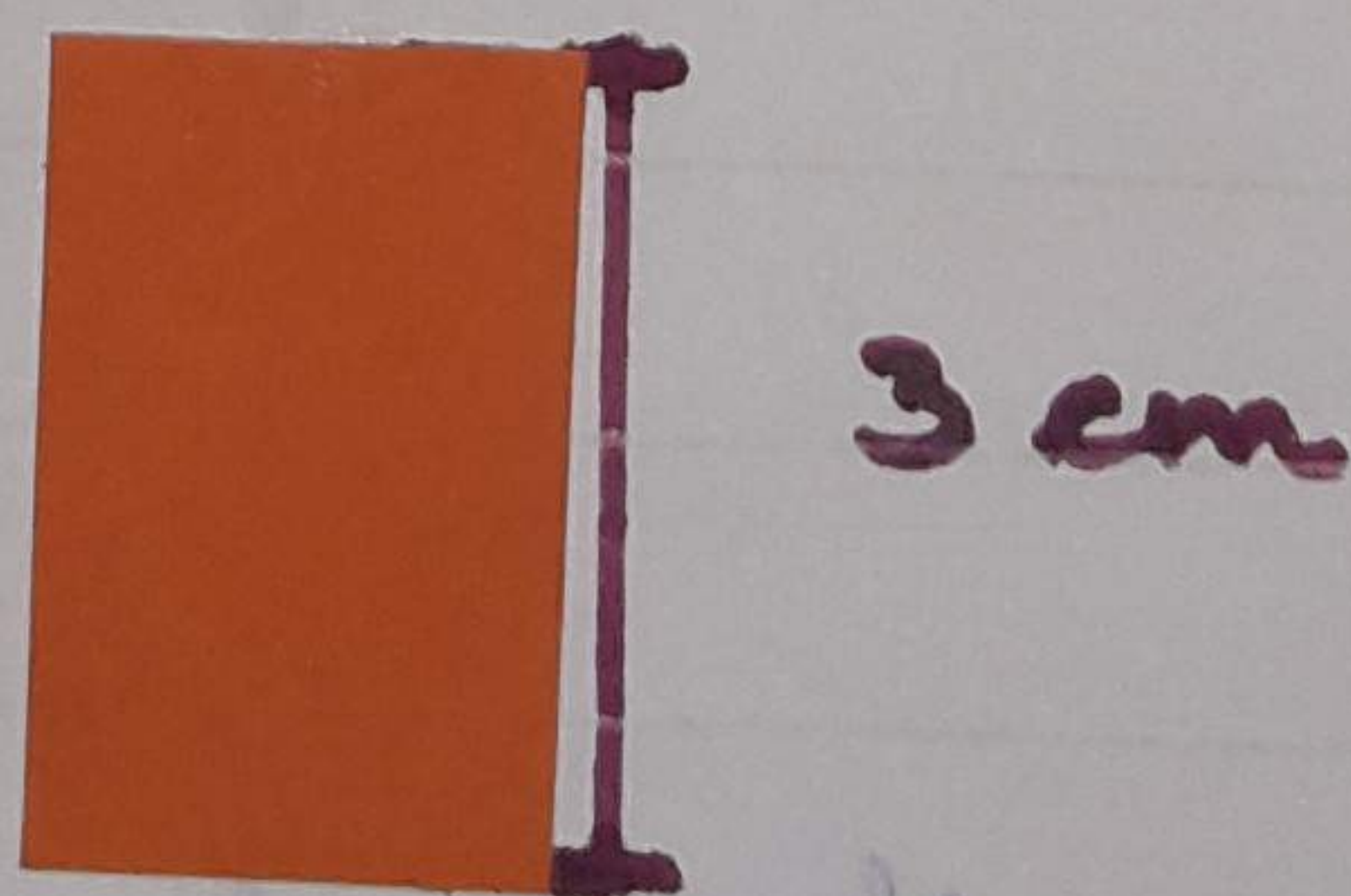
OBSERVATION :

$$= 81 \text{ m} \quad ; \quad = 1 \text{ m} \quad \wedge$$

$$= 101 \text{ m} \quad ; \quad = 10 \text{ m} \quad \wedge$$

$$\text{Sum} [A + B + C + D] = 360^\circ$$

Cylinder :



RESULT :

there, the sum property of a parallelogram is verified \Rightarrow

4 cm

PROBABILITY USING MOBILE NUMBER

OBJECTIVE :

➤ To find experimentally, the probability of unit's digits of any 10 mobile numbers.

MATERIALS REQUIRED :

- * Notebook
- * Pen
- * Ruler.

PROCEDURE :

- Choose any 10 mobile numbers at random.
- Unit place of a mobile number can be occupied by any one of the digits 0, 1, 2, ..., 9.
- Prepare a frequency distribution table for the digits at the unit's place using Tally marks.

- Write the frequency of each of the digits 0, 1, 2, 3, ..., 8, 9 from the table.

- Find the probability of each digit using the formula for experimental Probability.

- Prepare a frequency distribution table. (using the tally marks for the digits 0-9).

- Note down the frequency of each digit (0-9) from the table. Digits 0, 1, 2, 3, ..., 8, 9 are occurring respectively $n_0, n_1, n_2, \dots, n_8, n_9$ times.

- Calculate the probability of each digit considering it as an 'E' using the Formula.

$P(E) =$	Number of trials in the event occurred
	Total number of trials

- Therefore, respective experimental Probability of occurrence of 0, 1, 2, ..., 8, 9 is

given by :

$$P(0) = \frac{n_0}{N} ; P(1) = \frac{n_1}{N} ; \dots ; P(9) = \frac{n_9}{N}$$

OBSERVATION :

- * Total Number of mobile number chosen (N) = 10
- * No. of times 0 occurring at unit's place (n_0) = 1
- * No. of times 1 occurring at unit's place (n_1) = 2
- * No. of times 2 occurring at unit's place (n_2) = 1
- * No. of times 3 occurring at unit's place (n_3) = 0
- * No. of times 4 occurring at unit's place (n_4) = 1
- * No. of times 5 occurring at unit's place (n_5) = 1
- * No. of times 6 occurring at unit's place (n_6) = 0
- * No. of times 7 occurring at unit's place (n_7) = 1
- * No. of times 8 occurring at unit's place (n_8) = 0
- * No. of times 9 occurring at unit's place (n_9) = 3
- * ~~No. of times 10 occurring at unit's place (n_{10}) =~~

• Therefore, experimental probability of occurrence is given by:

$$P(0) \Rightarrow \frac{n_0}{N} = \frac{1}{10}$$

$$P(1) \Rightarrow \frac{n_1}{N} = \frac{2}{10} \Rightarrow \frac{1}{5}$$

$$P(2) \Rightarrow \frac{n_2}{N} = \frac{1}{10}$$

$$P(3) \Rightarrow \frac{n_3}{N} = \frac{0}{10}$$

$$P(4) \Rightarrow \frac{n_4}{N} = \frac{1}{10}$$

$$P(5) \Rightarrow \frac{n_5}{N} = \frac{1}{10}$$

$$P(6) \Rightarrow \frac{n_6}{N} = \frac{0}{10}$$

$$P(7) \Rightarrow \frac{n_7}{N} = \frac{1}{10}$$

$$P(8) \Rightarrow \frac{n_8}{N} = \frac{0}{10}$$

$$P(9) \Rightarrow \frac{n_9}{N} = \frac{3}{10}$$

RESULT :

Thus the experimental Probability of units digits of 10 mobile numbers was found.

OBSERVATION :

NO.	MOBILE NUMBER
1.	9442623449
2.	9789433449
3.	9488363449
4.	7598525225
5.	8217709884
6.	8838180991
7.	9486343961
8.	9488559797
9.	9944110510
10.	8903480842

EXPERIMENT - 6

PROBABILITY USING MOBILE NUMBER

UNIT DIGIT	TALLY MARKS	FREQUENCY [n_0, \dots, n_9]
0	I	1
1	II	2
2	I	1
3	-	0
4	I	1
5	I	1
6	-	0
7	I	1
8	-	0
9	III	3