

## CHAPTER - 12

## UNDERSTANDING QUADRILATERALS

## Ex - 12.1

- I 4 sides - Quadrilateral  
 8 sides - octagon  
 Nonagon - 9 sides  
 10 sides - Decagon  
 12 sides - Dodecagon.

## Ex - 12.2

- 2 Acc to the angle sum property of quadrilateral

$$\angle A + \angle B + \angle C + \angle D = 360^\circ$$

$$40^\circ + 140^\circ + x + x = 360^\circ$$

$$180^\circ + 2x = 360^\circ$$

$$2x = 180^\circ$$

$$x = 90^\circ$$

- 3 Acc to the angle sum property of quadrilateral.

$$\angle A + \angle B + \angle C + \angle D = 360^\circ$$

$$120^\circ + 82^\circ + 48^\circ + x = 360^\circ$$

$$250^\circ + x = 360^\circ$$

$$x = 110^\circ$$

4 Three angles of a Quadrilateral  
 $= 2x, 6x, 4x$ .

$$\begin{aligned}\text{least angle} &= 2x \\ \text{greatest angle} &= 6x \\ \text{Difference} &= 6x - 2x \\ &= 4x\end{aligned}$$

$$\text{fourth angle} = 4x$$

5 All angles are equal. i.e.  $x$ .

$$\begin{aligned}\angle A + \angle B + \angle C + \angle D &= 360^\circ \\ x + x + x + x &= 360^\circ \\ 4x &= 360^\circ \\ x &= 90^\circ\end{aligned}$$

All angles are  $90^\circ$  each.

6 Given  $AD \parallel BC$

$$\angle A + \angle B = 180^\circ \quad (\text{Adja. angles are Supplementary})$$

$$\angle D + \angle C = 180^\circ \quad ( \quad \quad \quad )$$

$$\begin{aligned}x + 110^\circ &= 180^\circ & \parallel & \text{ly} & y + 130^\circ &= 180^\circ \\ x &= 70^\circ & & & y &= 50^\circ\end{aligned}$$

### Ex. 12.3

- 2 Acc. to the properties of parallelogram. ~~Vertical~~ opposite angles are equal.

By Angle sum property.

$$\angle A + \angle B + \angle C + \angle D = 360^\circ$$

$$4x = 360^\circ$$

$$x = 90^\circ$$

- 3 Opp. sides are equal  
Adja. angles are supplementary.

$$\angle B = \angle D = 100^\circ$$

$$\angle A + \angle B = 180^\circ$$

$$\angle A + 100^\circ = 180^\circ$$

$$\angle A = 80^\circ$$

$$\angle A = 80^\circ, \angle B = 100^\circ, \angle C = 80^\circ, \angle D = 100^\circ$$

- 4 In ABCD parallelogram.

$$AB = 2x, BC = 3x.$$

$$\left. \begin{array}{l} BC = AD \\ AB = DC \end{array} \right\} \text{Opp. sides are equal.}$$

$$\text{Sum of Sides} = 50\text{cm.}$$

$$2x + 2x + 3x + 3x = 50$$

$$10x = 50$$

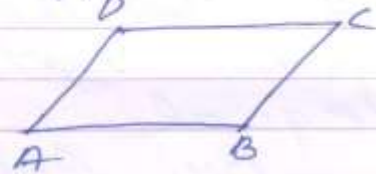
$$x = 5$$

5

In a parallelogram opp.  $\angle$ s are equal

$$\angle A = \angle C$$

$$\angle B = \angle D$$



By A. Sum. property

$$\angle A + \angle B + \angle C + \angle D = 360^\circ$$

$$x + y + x + y = 360^\circ$$

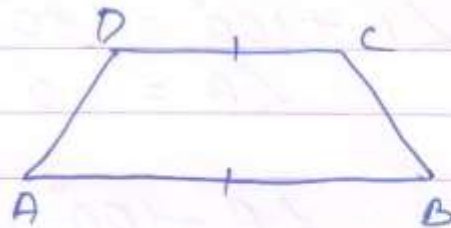
$$2x + 2y = 360^\circ$$

$$x + y = 180^\circ$$

$\Sigma x$ . 12.4

4  $AB \parallel DC$

$$\angle A = \angle B = 40^\circ$$



$$\angle A + \angle D = 180^\circ \text{ (Adj. angles of trape)}$$

$$40^\circ + \angle D = 180^\circ$$

$$\angle D = 140^\circ$$

$$\angle C + \angle B = 180^\circ \text{ ( " " )}$$

$$40^\circ + y = 180^\circ$$

$$y = 140^\circ$$

5 By Pythagorean theorem

$$AC^2 = AB^2 + BC^2$$

$$8^2 = a^2 + a^2$$

$$8^2 = 2a^2$$

$$a^2 = 32$$

$$a = \sqrt{32} = \sqrt{16 \times 2}$$

$$= 4\sqrt{2}$$

$$= 4 \times 1.41$$

$$= 5.66 \text{ cm.}$$

7 By pythagorons theorem

$$\begin{aligned}BD^2 &= BC^2 + DC^2 \\ &= 8^2 + 36 \\ &= 64 + 36 \\ &= 100 \\ &= 10^2\end{aligned}$$

Diagonal = 10cm.

8 In a rectangle opp sides are equal

$$\text{Perimeter} = 160\text{cm}$$

$$2(l+b) = 160$$

$$2(5x+3x) = 160$$

$$16x = 160$$

$$x = 10$$

$$5x = 5 \times 10 = 50\text{cm}$$

$$3x = 3 \times 10 = 30\text{cm}$$

9 In a trapezium adja. angles are supplementary.

$$\angle A + \angle D = 180^\circ$$

$$50 + \angle D = 180^\circ$$

$$\angle D = 130^\circ$$

liky

$$\angle B + \angle C = 180^\circ$$

$$70 + \angle C = 180^\circ$$

$$\angle C = 180^\circ - 70^\circ$$

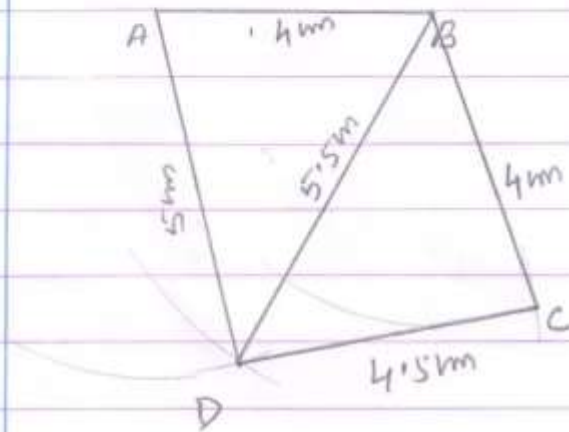
$$= 110^\circ$$

## CONSTRUCTION OF QUADRILATERAL CHAPTER-14.

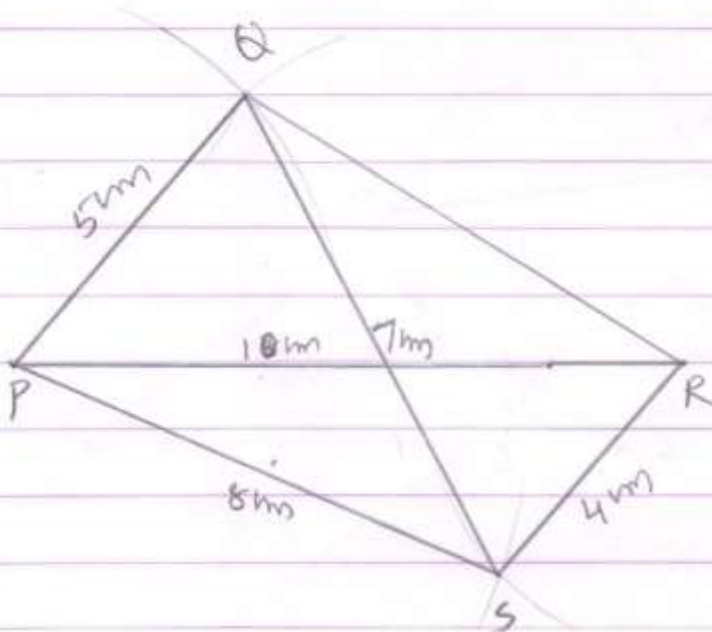
1. Construct a quadrilateral ABCD, given that  $AB = 4\text{cm}$ ,  $BC = 4\text{cm}$ ,  $CD = 4.5\text{cm}$ ,  $DA = 5\text{cm}$ ,  $BD = 5.5\text{cm}$

### Steps of Construction

- 1) Draw AB of 4 cm
- 2) Draw a line segment of 5 cm from A and B. they meet at D.
- 3) From D draw a line segment of 4.5 cm and from B, 4 cm they meet at C.
- 4) Join AD, BD, BC and DC.
- 5) ABCD is a required quadrilateral ABCD.

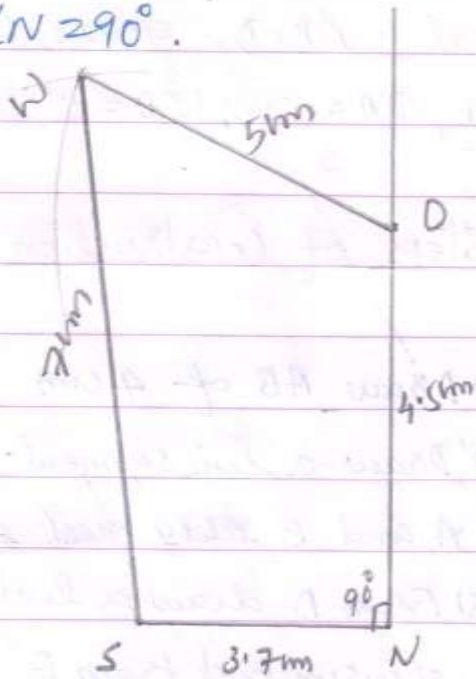


2. Construct a quadrilateral PQRS.  
 $PQ = 5\text{cm}$ ,  $RS = 4\text{cm}$ ,  $PS = 8\text{cm}$ ,  $PR = 10\text{cm}$ ,  $QS = 7\text{cm}$ .



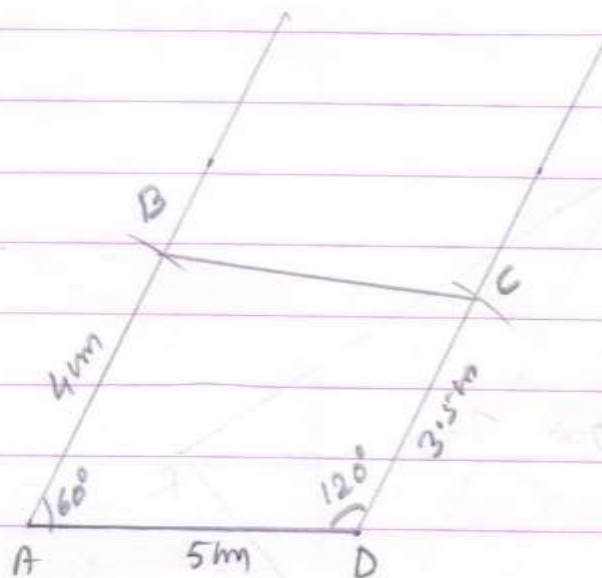
Construieți a quadrilaterală SNOW

- 3  $SN = 3.7\text{m}$ ,  $NO = 4.5\text{m}$ ,  $OW = 5\text{m}$ ,  $SW = 7\text{m}$   
 $\angle N = 90^\circ$ .

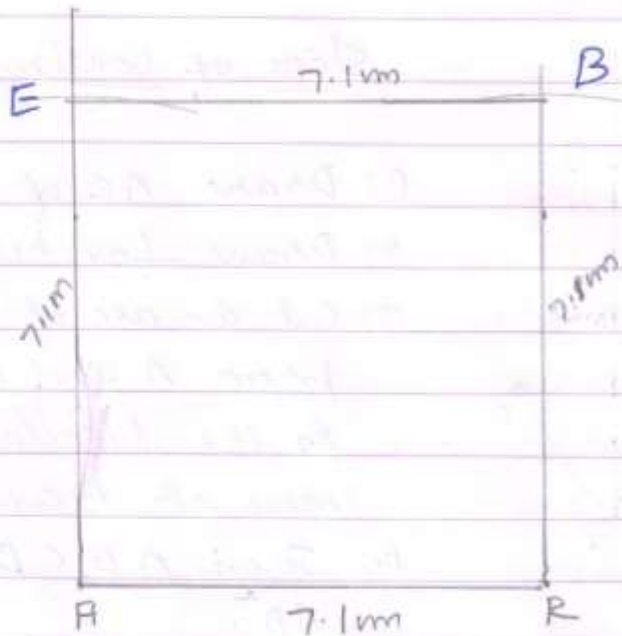


4 Construiți a quadrilaterală ABCD

- $AB = 4\text{m}$ ,  $CD = 3.5\text{m}$ ,  $AD = 5\text{m}$ ,  $\angle A = 60^\circ$ ,  $\angle D = 120^\circ$



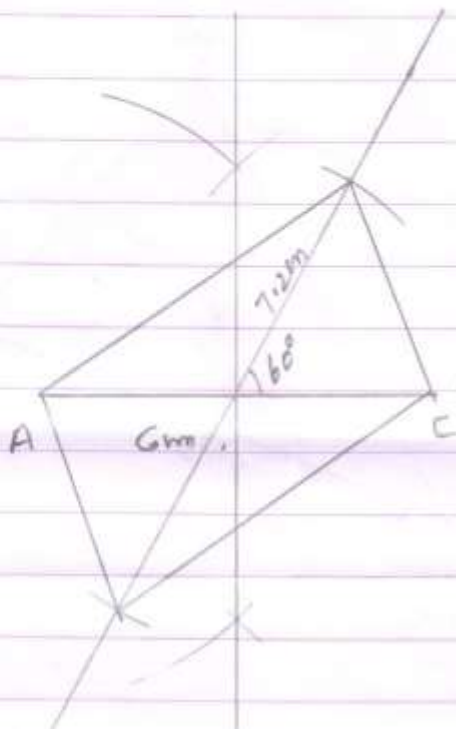
5 Draw a square BEAR, where  $AR = 7.1\text{cm}$ .



### Steps of construction

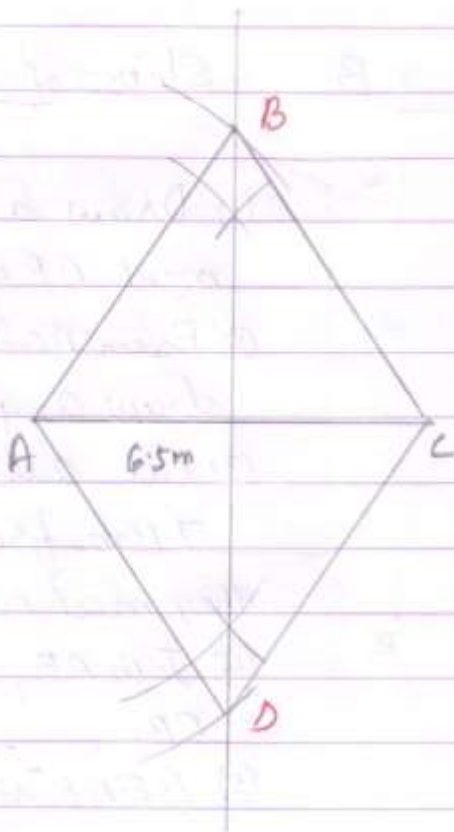
- (1) Draw a line segment AR of  $7.1\text{cm}$ .
- (2) From A and R draw angle of  $90^\circ$ .
- (3) Cut an arc of  $7.1\text{cm}$  from A and R they meet at E and B.
- (4) Join AE, RB, and EB.
- (5) BEAR is a square.

6 Draw a parallelogram ABCD where  $AC = 6\text{cm}$ ,  $DB = 7.2\text{cm}$ ,  $\angle DEC = 60^\circ$ .





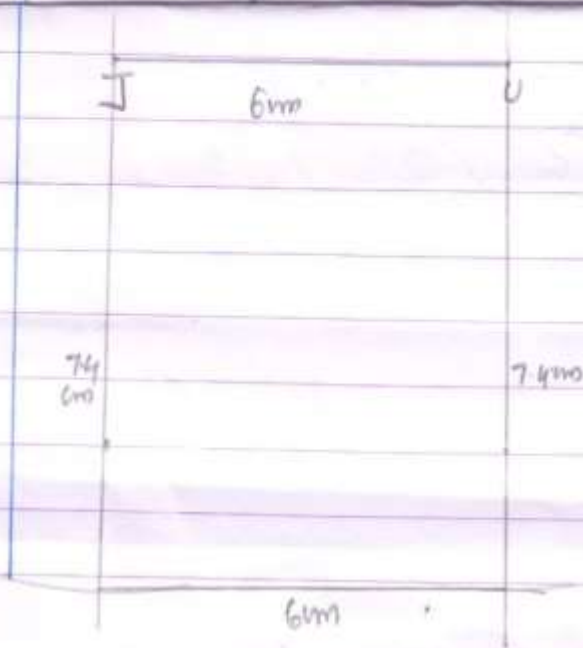
7 Construct a rhombus ABCD  
 $AB = 5\text{cm}$  and diagonal  $AC = 6.5\text{cm}$ .



Steps of Construction

- (1) Draw AC of  $6.5\text{cm}$
- (2) Draw Lor bisector of AC
- (3) Cut an arc of  $5\text{cm}$  from A and C on on the bisector, they meet at B and D
- (4) Join AB, CD, BC, and AD.
- (5) ABCD is a rhombus.

8 Draw a rectangle JUST.  
 $JU = 6\text{cm}$ ,  $JS = 7.4\text{cm}$ .



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