PRACTICAL GEOMETRY

Class 8

MODULE 3/3

CONDITION – 4 :

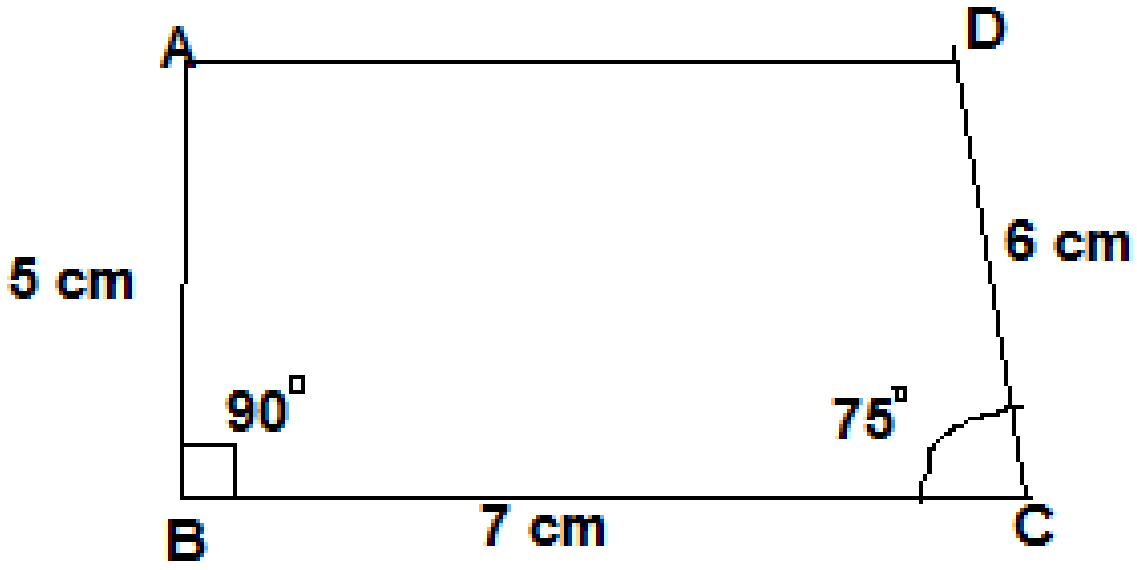
WHEN THREE SIDES AND TWO INCLUDED ANGLES ARE GIVEN

EXAMPLE

Construct a Quadrilateral ABCD where

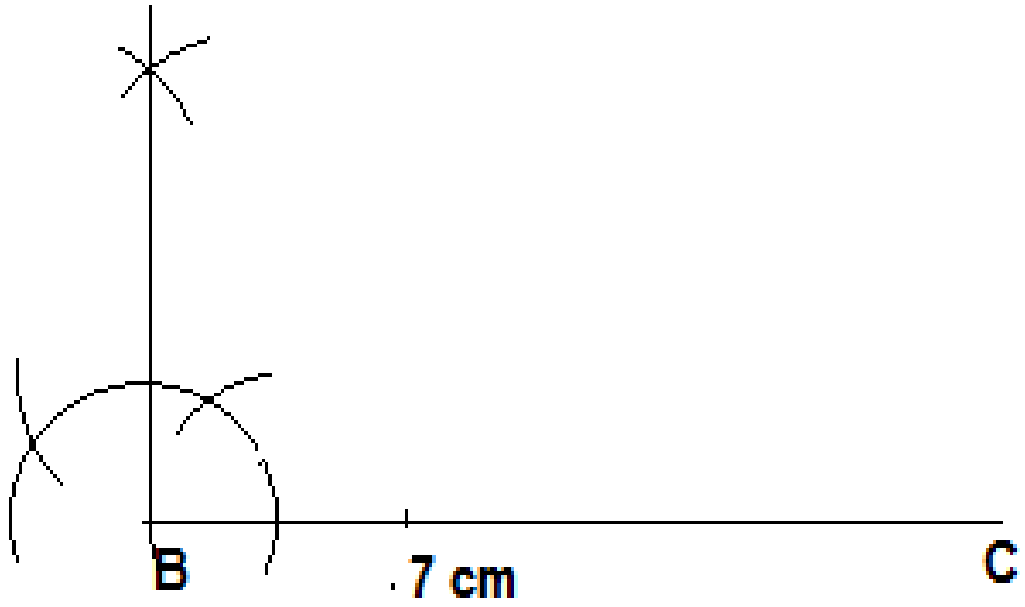
- AB= 5 cm
- BC = 7 cm
- CD = 6 cm
- ∠B = 90°
- ∠C = 75°

Step – 1 : Draw a rough figure of given Quadrilareal.

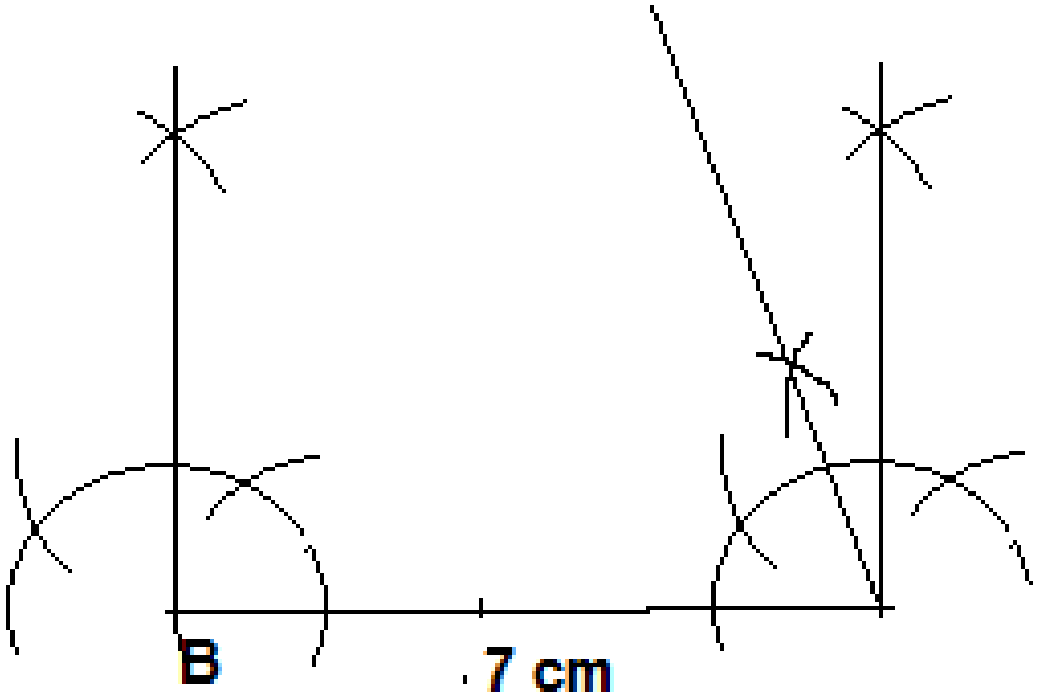


Step – 2 : Draw BC = 7 cm as base

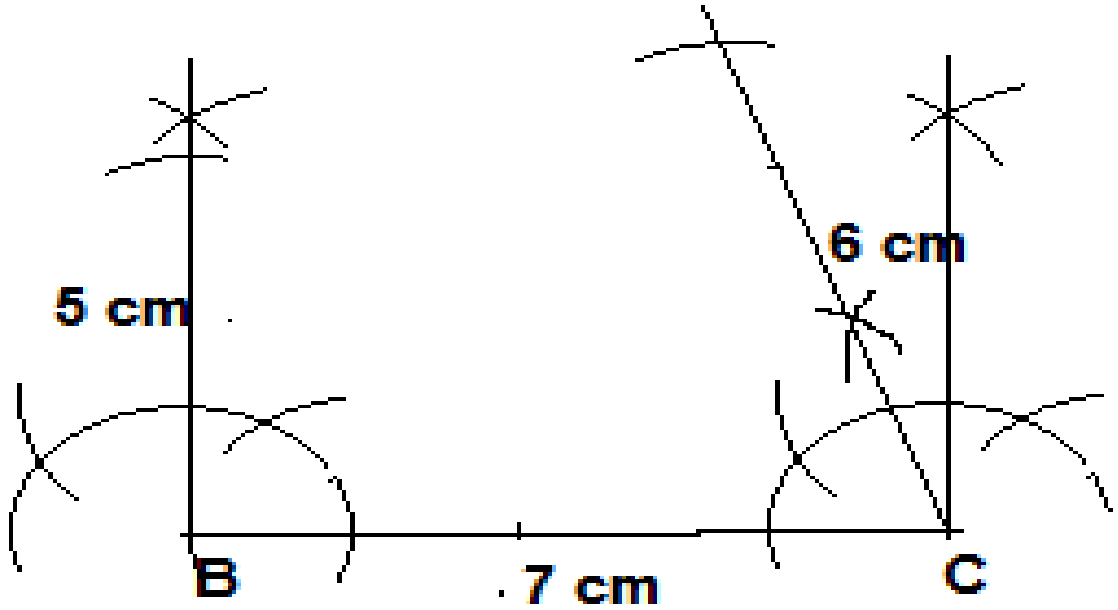
Step – 3 : Draw ∠B = 90°



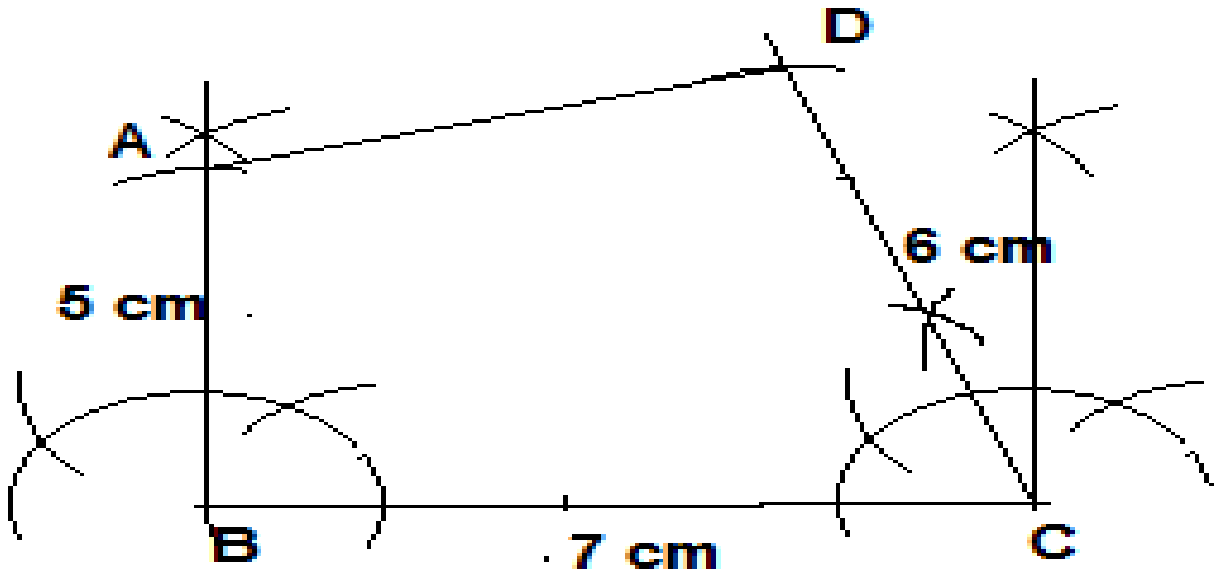
Step – 4 : Draw ∠C = 75°



Step – 5 : With B as centre and BA = 5 cm as radius draw an arc
With C as centre and CD = 6 cm as radius draw an arc



Step – 6 : Join AD
ABCD is the required Quadrilateral

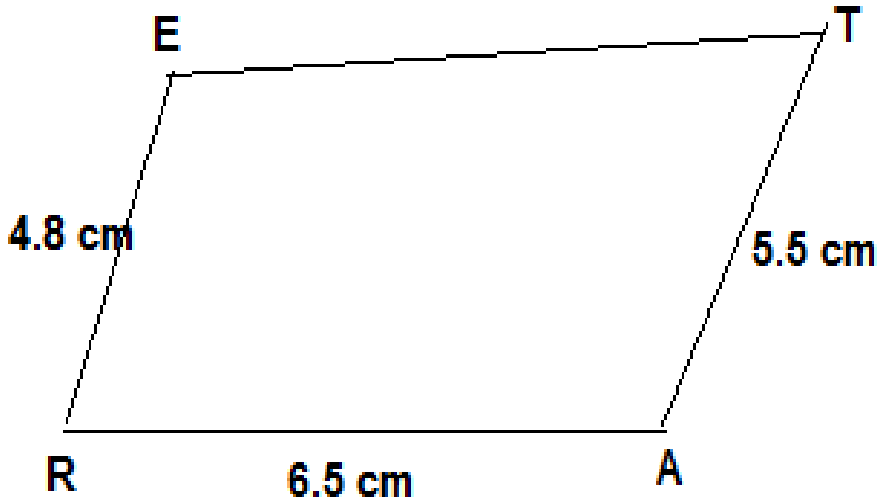


EXAMPLE – 2 :

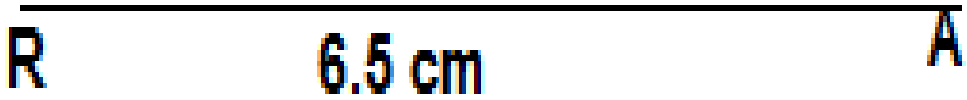
Draw a Quadrilateral RATE where

- RA = 6.5 cm,
- AT = 5.5 cm,
- RE = 4.8 cm,
- ∠R = 60°
- ∠A = 120°

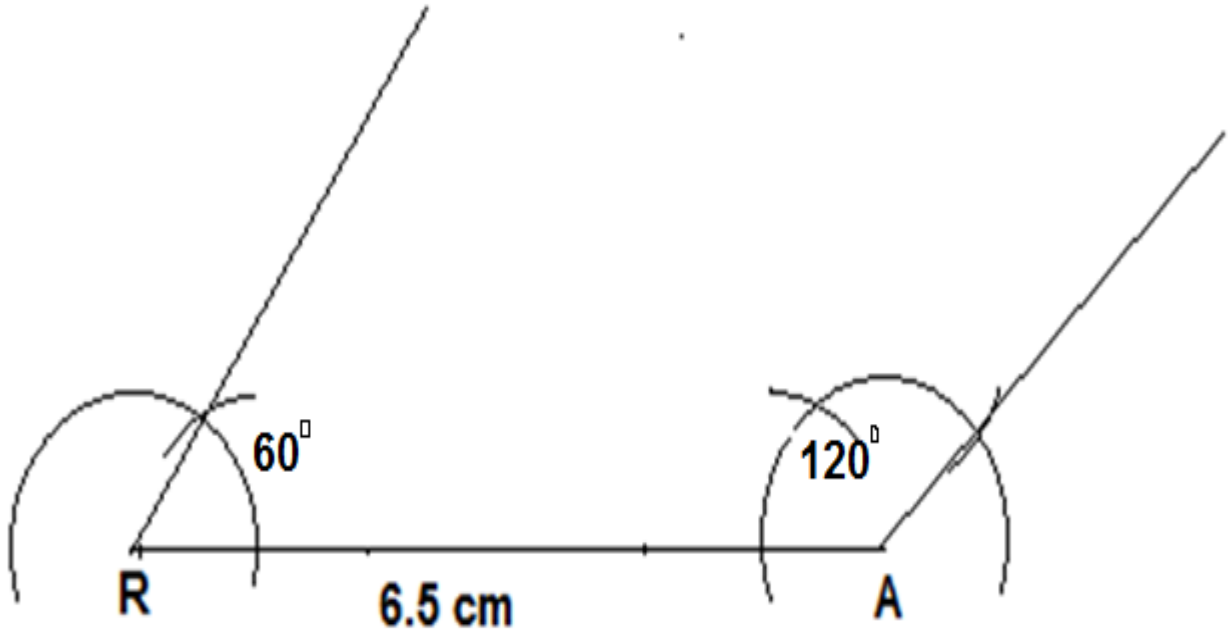
Step – 1 : Draw a rough sketch of the given Qudrilateral RATE



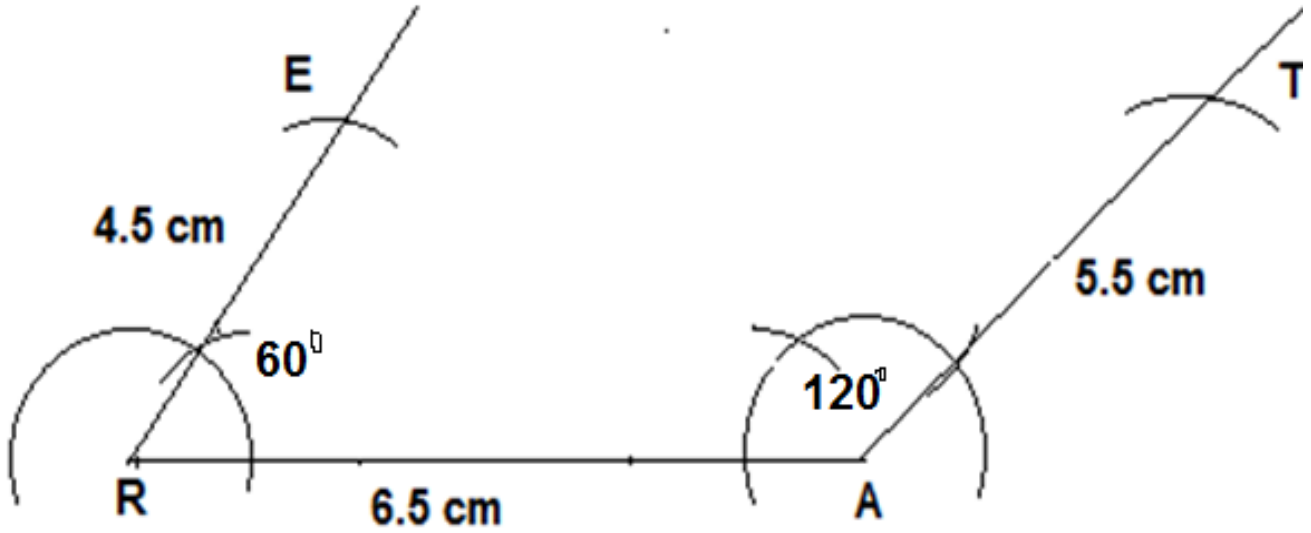
Step – 2 : Draw RA = 6.5 cm



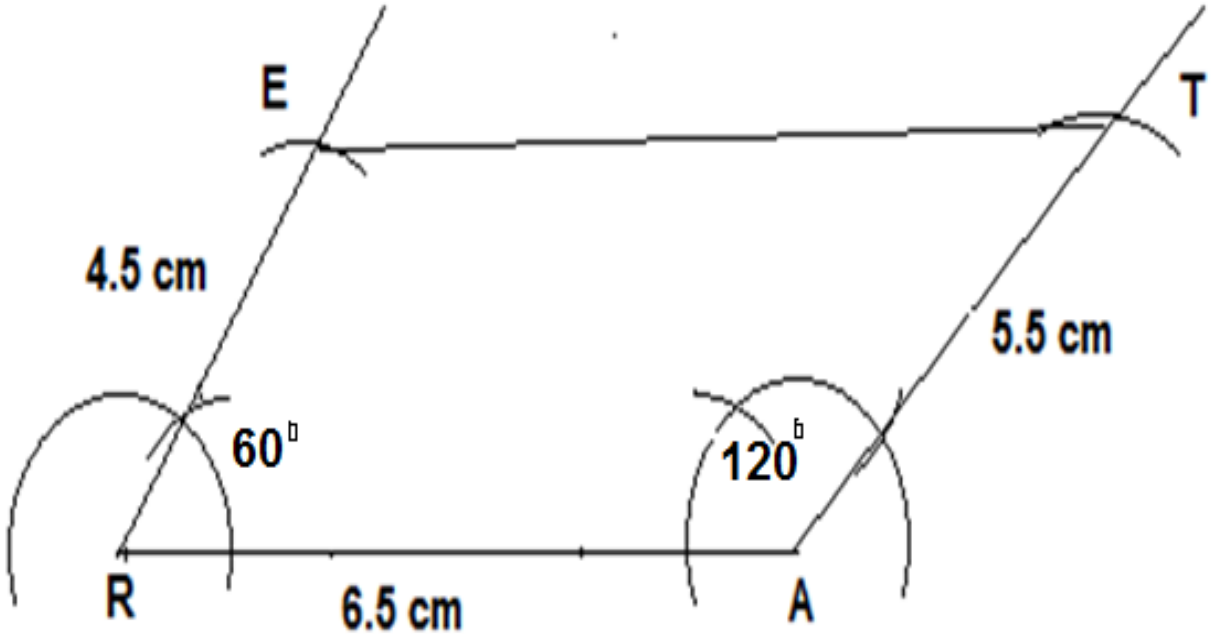
Step – 3 : Draw ∠R = 60° & ∠A = 120°



Step – 4 : With R as centre and RE = 4.5 cm draw an arc
With A as centre and AT = 5.5 cm draw an arc

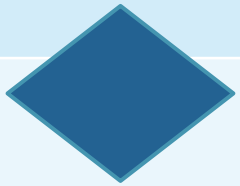
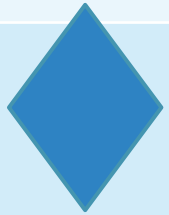


Step 5 : Join ET
RATE is the required Quadrilateral.



CONDITION – 5 : When Other Special Properties are Known.

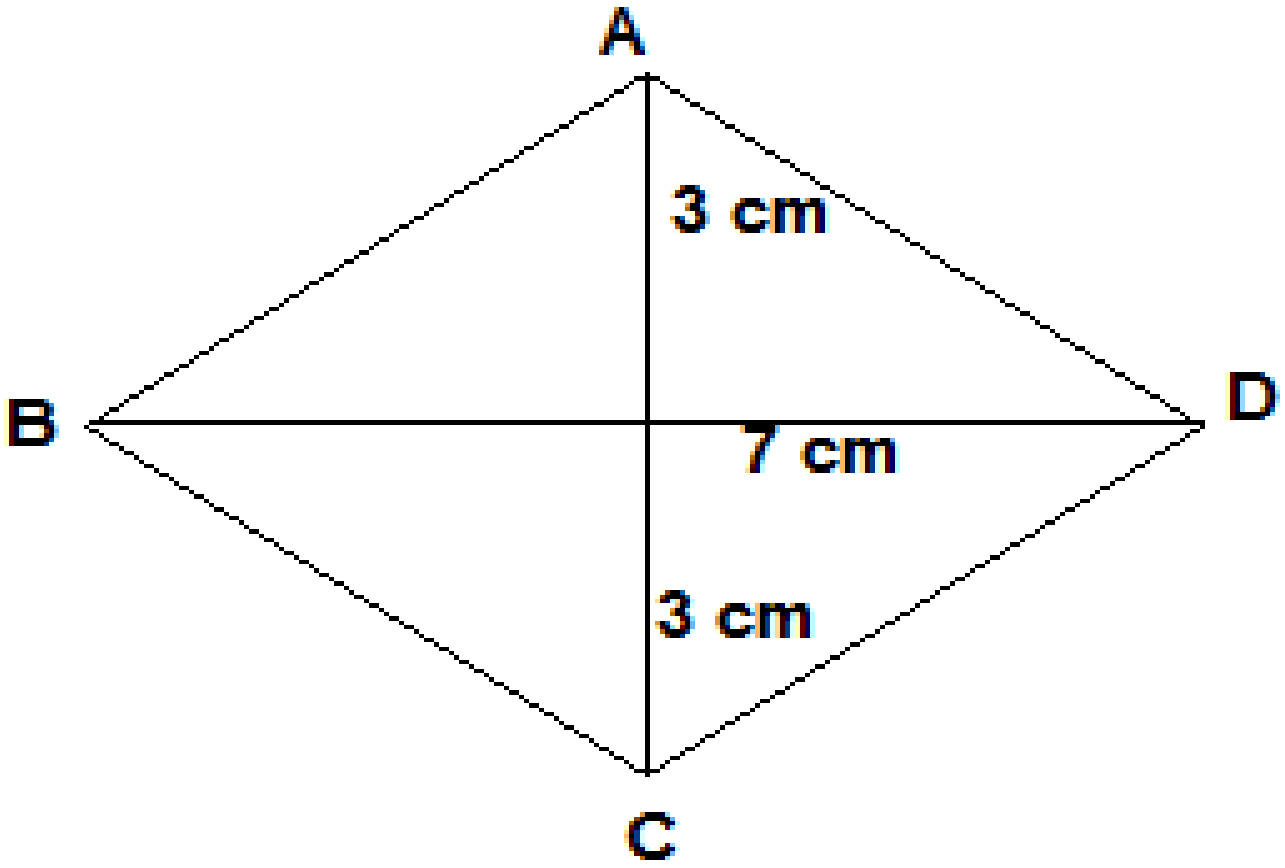
- To construct a Quadrilateral, we used 5 measurements in our work.
- Is there any Quadrilateral which can be drawn with less number of available measurements?
- Yes, by using the properties of different Quadrilaterals

Quadrilateral	Rough Sketch	Properties
Parallelogram		i) Each pair of opposite sides are parallel. ii) Opposite sides are equal iii) Opposite angles are equal iv) Diagonals bisect each other
Rhombus		i) All sides are equal ii) Diagonals bisect each other iii) Opposite sides are parallel and equal
Rectangle		i) Each angle is a right angle ii) Diagonals are equal iii) Pair of Opposite sides are parallel and equal
Square		i) All sides are equal and parallel. ii) Each angle is a right angle iii) Diagonals are equal and bisect each other
Kite		i) Diagonals are perpendicular to one another ii) Pair of adjacent sides are equal iii) One of the diagonals bisect the other

EXAMPLE

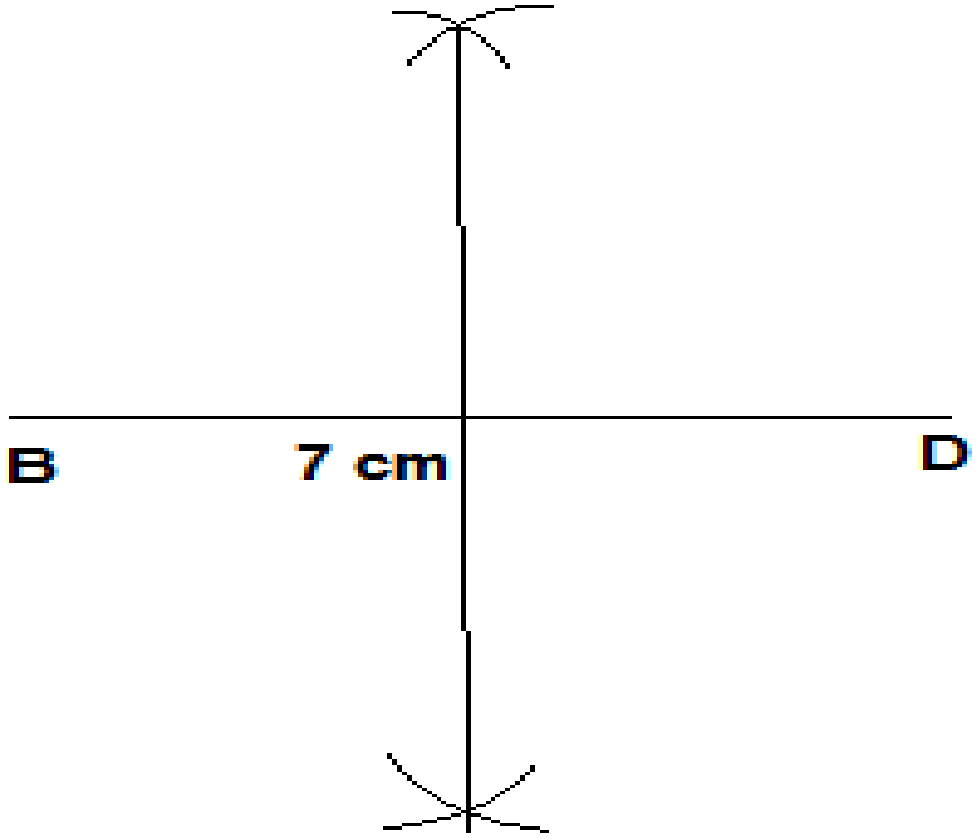
- Is it possible to construct a Rhombus ABCD where AC = 6 cm and BD = 7 cm? justify your answer.

Step – 1 : let us first draw a rough sketch of the given Rhombus ABCD

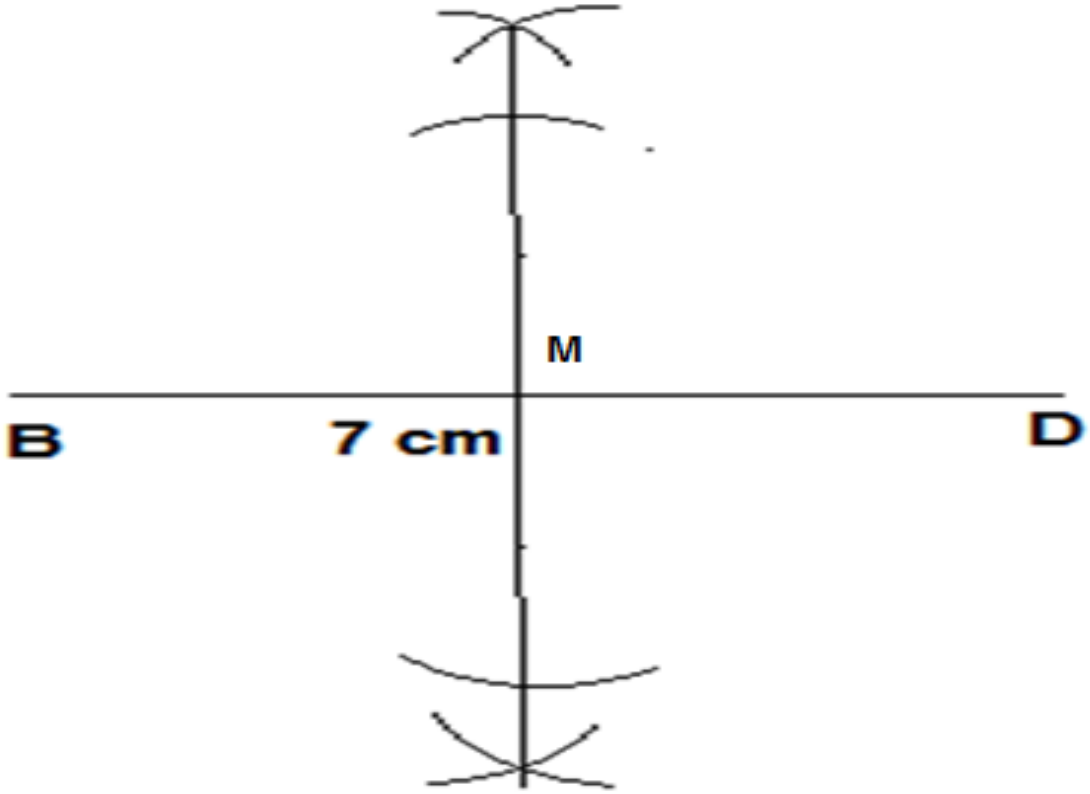


Step -2 : Draw BD = 7 cm

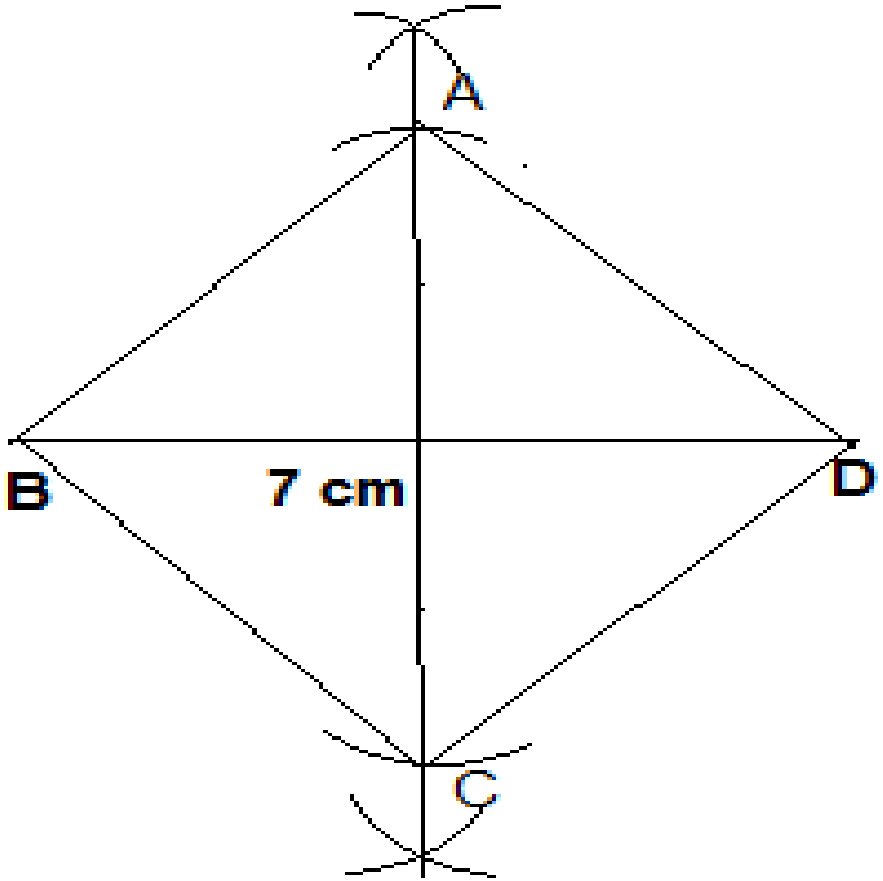
Step – 2 : Draw Perpendicular bisector of BD (In Rhombus, diagonals are perpendicular to each other)



Step – 3 : With M as centre draw an arc of radius 3 cm (above & below) on the perpendicular.



Step – 4 : Join BA, DA, BC & DC. ABCD is the required Rhombus.

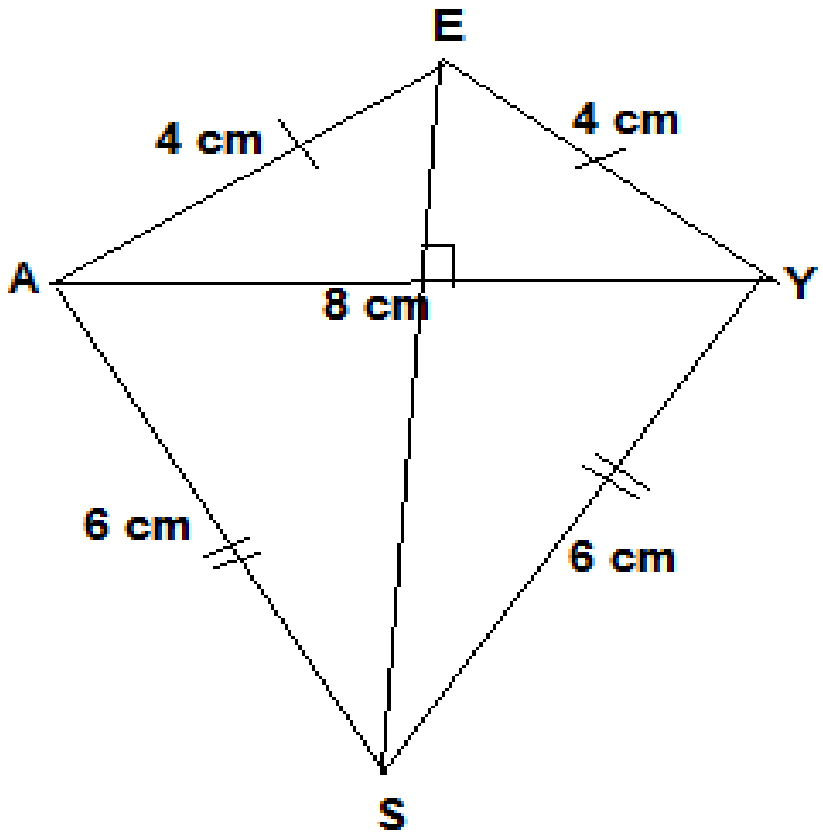


EXAMPLE – 2 :

Construct the kite EASY if

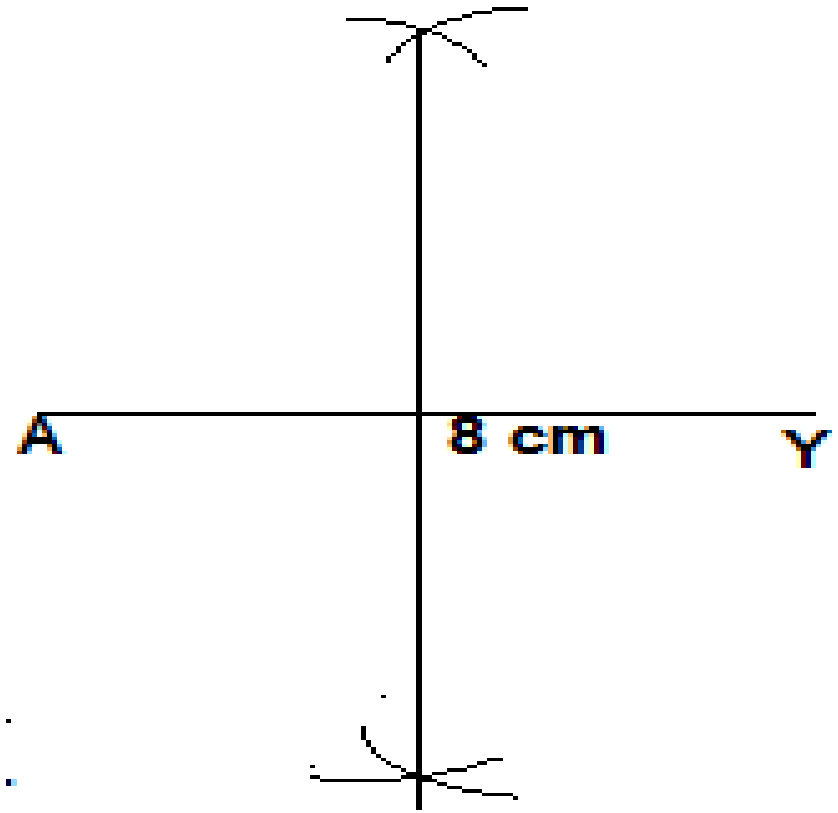
- AY = 8 cm,
- EY = 4 cm and
- SY = 6 cm

Step – 1 : Draw a rough sketch by using the measurements

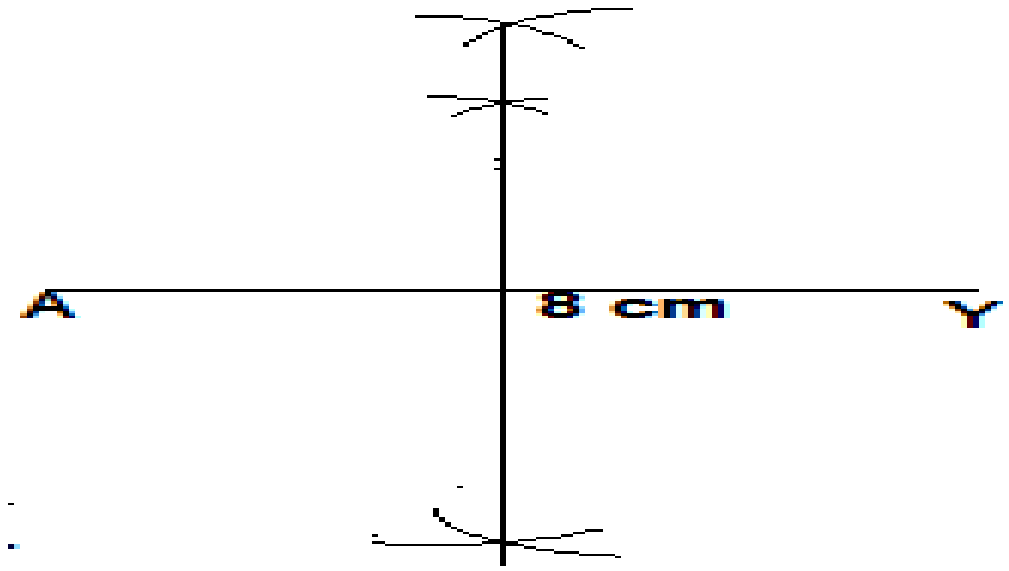


Step – 2 : Draw AY = 8 cm

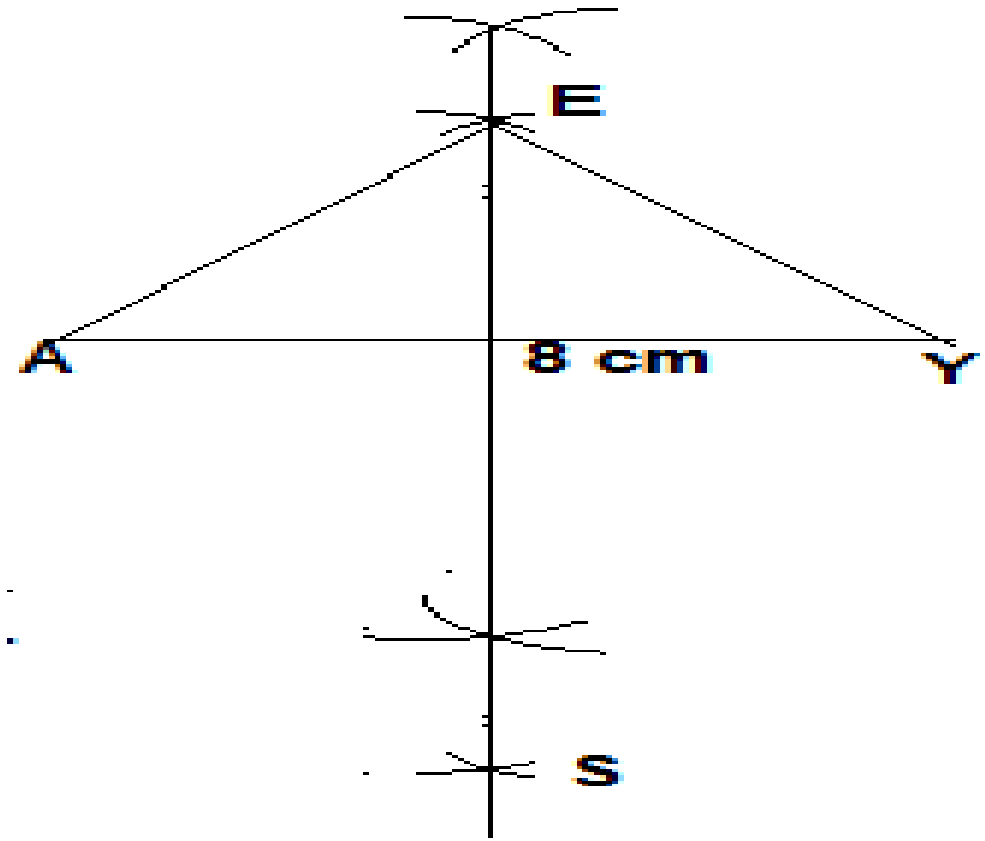
Step – 3 : Draw a perpendicular bisector AY (In kite, the diagonals are perpendicular to each other)



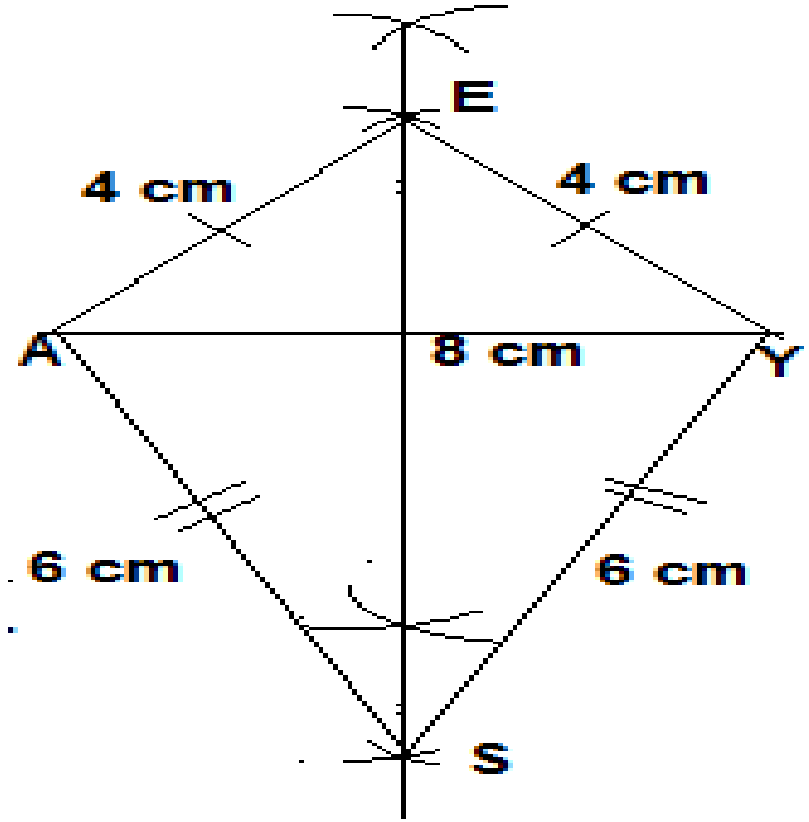
Step – 4 : With A as centre draw AE = 4 cm on the perpendicular
With Y as centre draw YE = 4 cm on the perpendicular
(the adjacent sides are equal in kite)



Step – 5 : Join AE & YE



Step – 6 : Draw AS = YS = 6 cm
Join AS and YS
EASY is the required Kite



SUMMARY

- CONDITION – 4 :

  When Three Sides And Two Included Angles Are Given

- CONDITION – 5 :

  When Other Special Properties are Known.

- Parallelogram : i) each pair of opposite sides are equal and parallel
  ii) opposite angles are equal.
  iii) diagonals are equal.
- Rhombus: i) each pair of opposite sides are equal and parallel
  ii) all sides are equal.
  iii) diagonals are perpendicular to each other.
- Rectangle : i) all the properties of parallelogram.
  ii) each angle is equal to right angle.
  iii) diagonals are equal
- Square : i) all properties of parallelogram.
  ii) all sides are equal.
  iii) diagonals are equal.
- Kite : i) diagonals are perpendicular to each other.
  ii) one of the diagonals bisect other

HOME ASSIGNMENT

- Construct a quadrilateral ABCD, where AB = 4 cm, BC = 5 cm, CD = 6.5 cm, and B = ∠105° and C = ∠80°
- Construct a quadrilateral DEAR, DE = 4 cm, EA = 5 cm, AR = 4.5 cm, E = ∠ 60° A = ∠ 90°
- Construct a Square READ with RE = 5.1 cm.
- A Rhombus whose diagonals are 5.2 cm and 6.4 cm long.