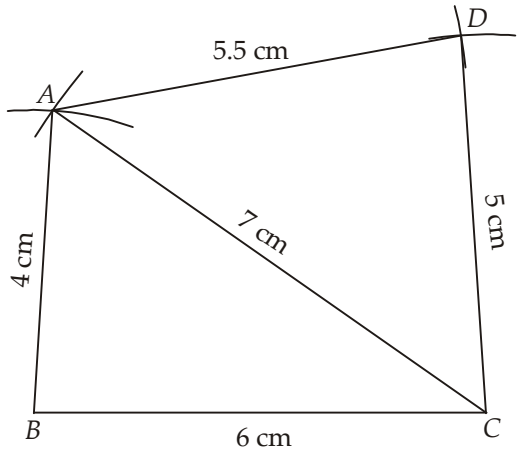
Chapter 13 : Practical Geometry

ANSWER KEYS

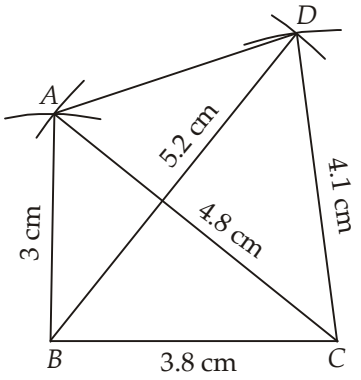
EXERCISE 13.1

1. Given that : AB = 4 cm, BC = 6 cm, CD = 5 cm, AD = 5.5 cm and AC = 7 cm.



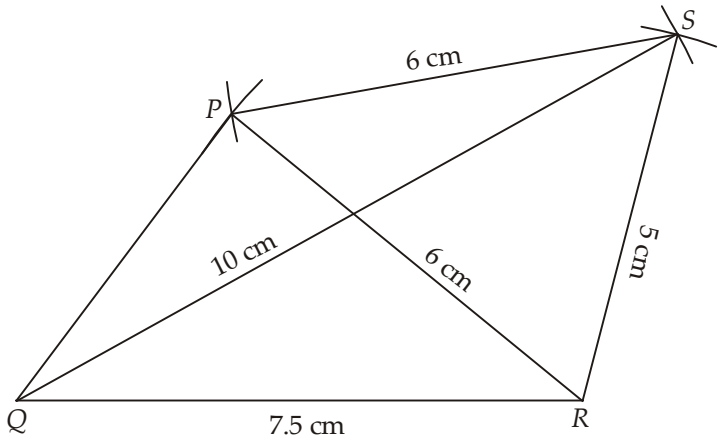
Hence, $ABCD$ is the required quadrilateral.

2. Given that : AB = 3 cm, BC = 3.8 cm, CD = 4.1 cm, AC = 4.8 cm and BD = 5.2 cm.



Hence, $ABCD$ is the required quadrilateral.

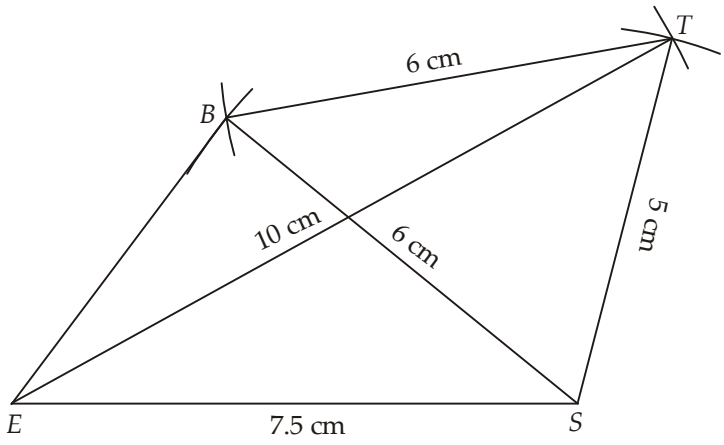
3. Given that : RS = 5 cm, $PR = PS$ = 6 cm, QR = 7.5 cm and QS = 10 cm.



Hence, $PQRS$ is the required quadrilateral.

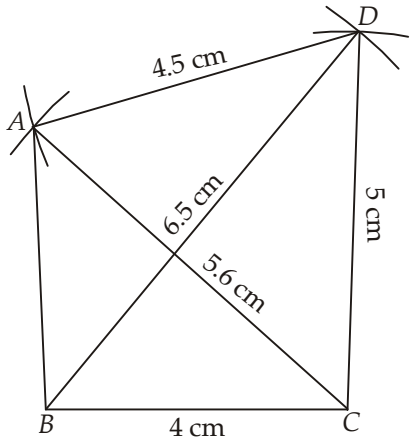
On measurement, PQ = 4.7 cm.

4. Given that : ES = 7.5 cm, BS = 6 cm, BT = 6 cm, ST = 5 cm and ET = 10 cm.



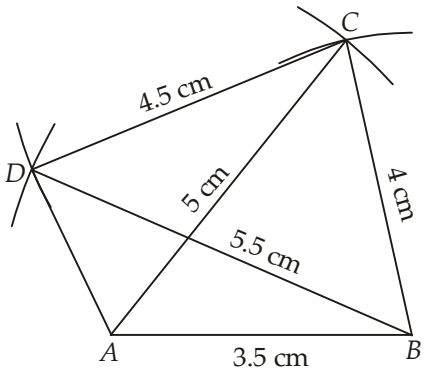
Hence, BEST is the required quadrilateral.

5. **Given that :** $BC = 4$ cm, $CA = 5.6$ cm, $AD = 4.5$ cm, $CD = 5$ cm and $BD = 6.5$ cm.



Hence, $ABCD$ is the required quadrilateral.

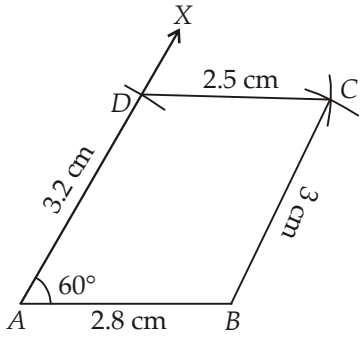
6. **Given that :** $AB = 3.5$ cm, $BC = 4$ cm, $CD = 4.5$ cm, $AC = 5$ cm and $BD = 5.5$ cm.



Hence, $ABCD$ is the required quadrilateral.

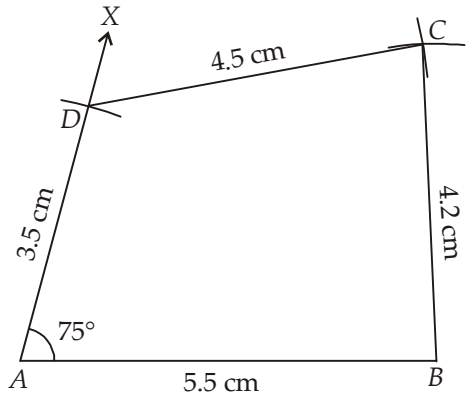
EXERCISE 13.2

1. **Given that :** $AB = 2.8$ cm, $DA = 3.2$ cm, $CD = 2.5$ cm, $BC = 3$ cm and $\angle A = 60°$.



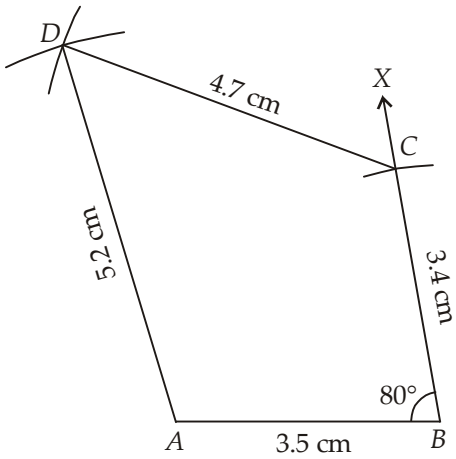
Hence, $ABCD$ is the required quadrilateral.

2. **Given that :** $AB = 5.5$ cm, $BC = 4.2$ cm, $CD = 4.5$ cm, $AD = 3.5$ cm and $\angle A = 75°$.



Hence, $ABCD$ is the required quadrilateral.

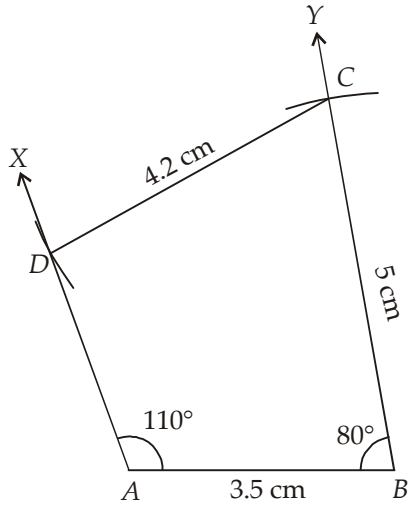
3. **Given that :** $AB = 3.5$ cm, $BC = 3.4$ cm, $CD = 4.7$ cm, $AD = 5.2$ cm and $\angle B = 80°$.



Hence, $ABCD$ is the required quadrilateral.

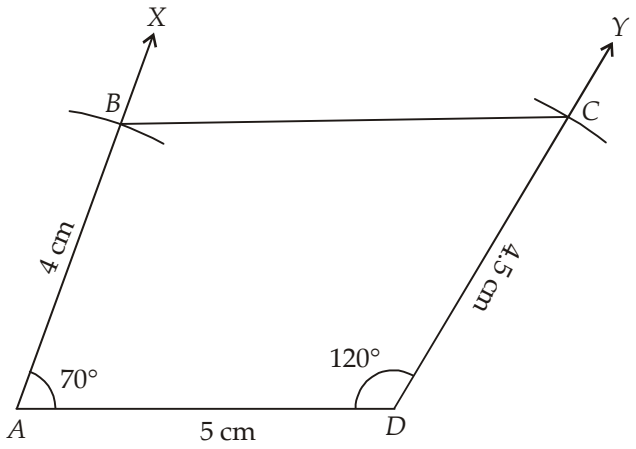
EXERCISE 13.3

1. **Given that :** $AB = 3.5$ cm, $BC = 5$ cm, $CD = 4.2$ cm, $\angle A = 110°$, $\angle B = 80°$.



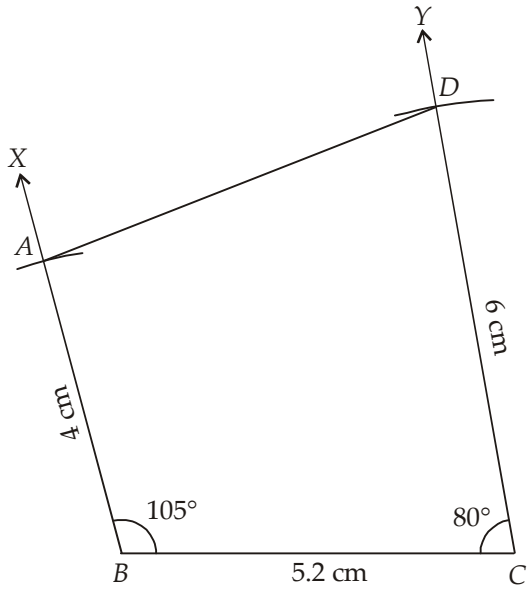
Hence, $ABCD$ is the required quadrilateral.

2. Given that : AB = 4 cm, CD = 4.5 cm, AD = 5 cm, $\angle A = 70°$ and $\angle D = 120°$.



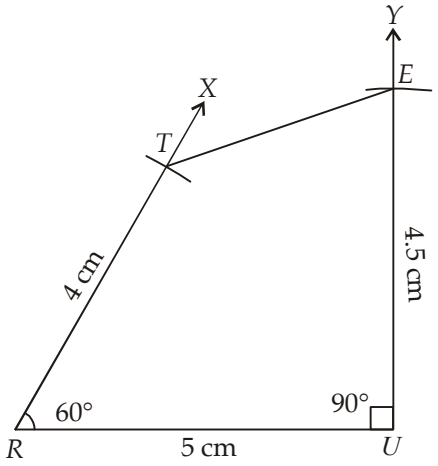
Hence, $ABCD$ is the required quadrilateral.

3. Given that : AB = 4 cm, BC = 5.2 cm, CD = 6 cm, $\angle B = 105°$ and $\angle C = 80°$.



Hence, $ABCD$ is the required quadrilateral.

4. Given that : TR = 4 cm, RU = 5 cm, UE = 4.5 cm, $\angle R = 60°$ and $\angle U = 90°$.



Hence, TRUE is the required quadrilateral.

EXERCISE 13.4

1. Given that : AB = 5.5 cm, AD = 3 cm, $\angle A = 70°$, $\angle B = 95°$ and $\angle C = 80°$.

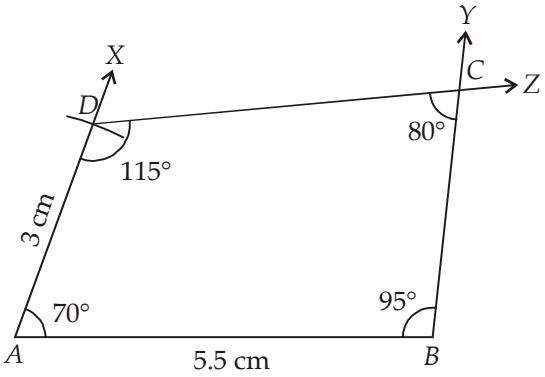
Since, sum of all angles of a quadrilateral is 360°.

$\therefore \quad \angle A + \angle B + \angle C + \angle D = 360°$

$\Rightarrow \quad 70° + 95° + 80° + \angle D = 360°$

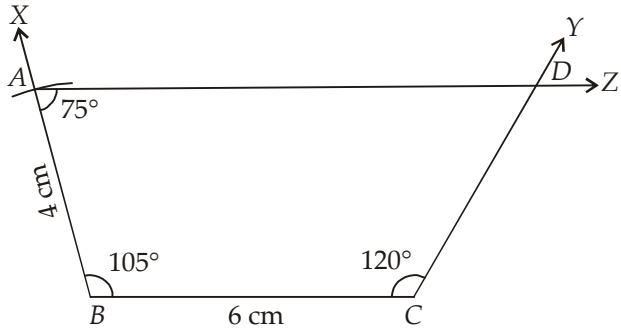
$\Rightarrow \quad 245° + \angle D = 360°$

$\Rightarrow \quad \angle D = 360° - 245° = 115°.$



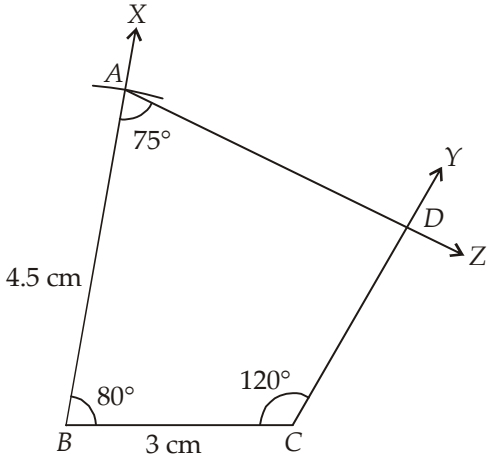
Hence, $ABCD$ is the required quadrilateral.

2. Given that : AB = 4 cm, BC = 6 cm, $\angle A = 75°$, $\angle B = 105°$, and $\angle C = 120°$.



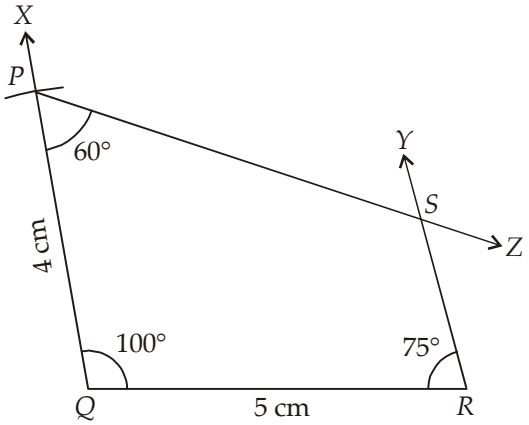
Hence, $ABCD$ is the required quadrilateral.

3. Given that : AB = 4.5 cm, BC = 3 cm, $\angle A = 75°$, $\angle B = 80°$ and $\angle C = 120°$.



Hence, $ABCD$ is the required quadrilateral.

4. Given that : PQ = 4 cm, QR = 5 cm, $\angle P = 60°$, $\angle Q = 100°$ and $\angle R = 75°$.



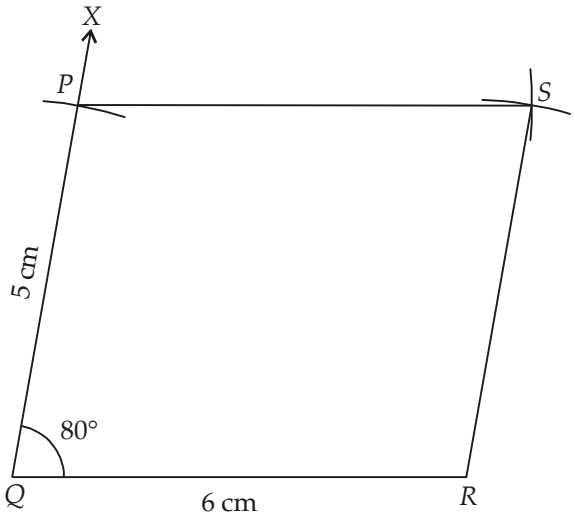
Hence, $PQRS$ is the required quadrilateral.

EXERCISE 13.5

1. Given that : PQ = 5 cm, QR = 6 cm, $\angle PQR = 80°$.

Since, in a parallelogram, opposite sides are equal.

$\therefore$ $PQ = SR$ = 5 cm and $QR = PS$ = 6 cm.

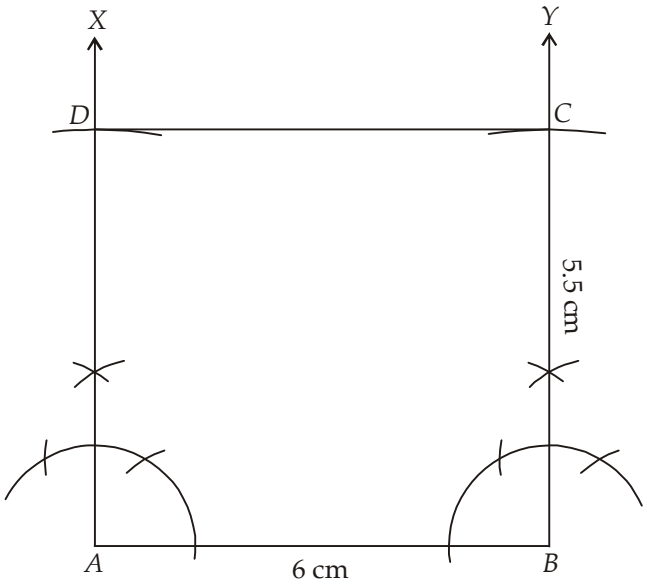


Hence, $PQRS$ is the required parallelogram.

2. Given that : AB = 6 cm and BC = 5.5 cm.

Since, in a rectangle, opposite sides are equal and the measure of each angle is 90°.

$\therefore$ $\angle A = \angle B = \angle C = \angle D = 90°$

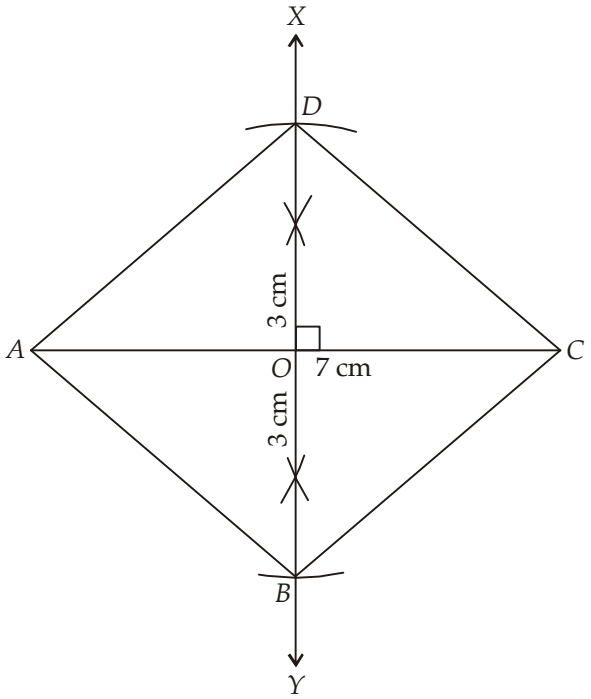


Hence, $ABCD$ is the required rectangle.

3. Given that : Let $ABCD$ be a rhombus, and AC and BD be the diagonals of the rhombus.

$\therefore$ AC = 7 cm and BD = 6 cm

Since, diagonals of a rhombus bisect each other at right angles.



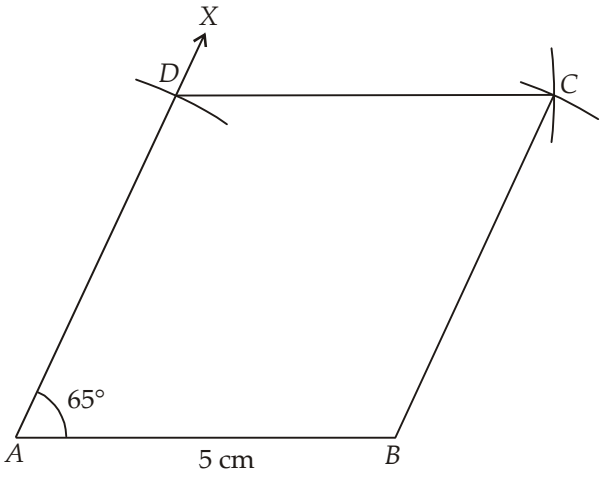
Hence, $ABCD$ is the required rhombus.

4. Given that : Let *ABCD* be required rhombus.

Since, each side of a rhombus are of equal length.

$\therefore$ $AB = BC = CD = DA = 5$ cm.

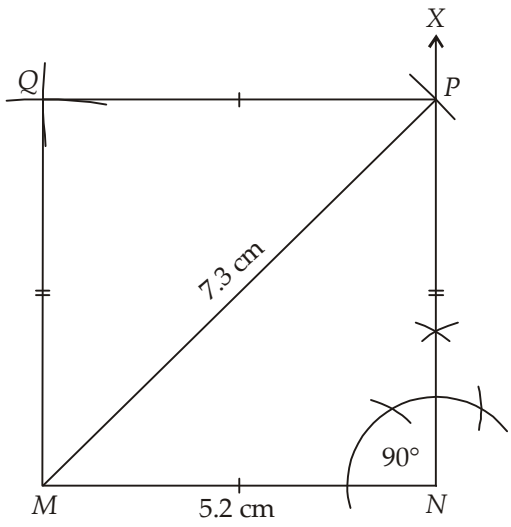
Let $\angle A = 65°$.



Hence, *ABCD* is the required rhombus.

5. Given that : *MN* = 5.2 cm and diagonal *MP* = 7.3 cm.

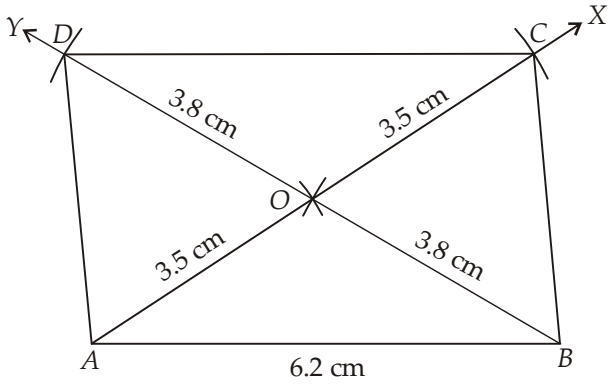
Adjacent sides of a rectangle are of equal length, and each angle is of 90°.



Hence, *MNPQ* is the required rectangle.

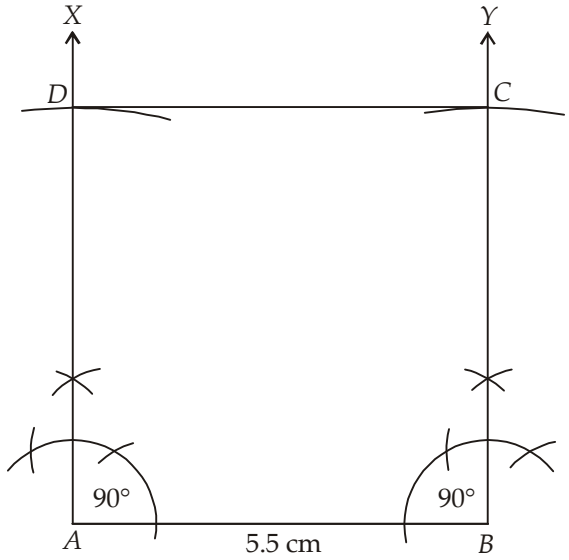
6. Given that : Let *ABCD* be the required parallelogram in which *AB* = 6.2 m, *AC* = 7 cm and *BD* = 7.6 cm.

We know that the diagonals of a parallelogram bisect each other.



Hence, *ABCD* is the required parallelogram.

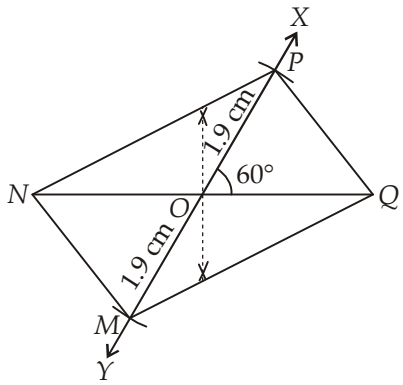
7. Given that : Let *ABCD* be the required square in which *AB* = *BC* = *CD* = *DA* = 5.5 cm.



Hence, *ABCD* is the required square.

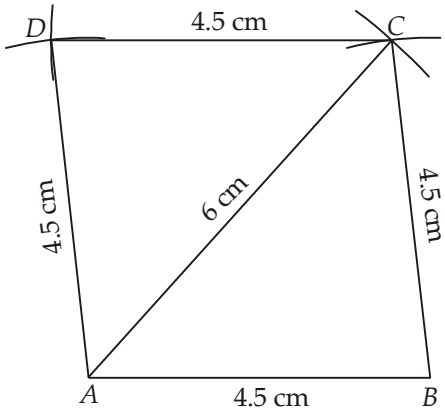
8. Given that : *MP* = 3.8 cm, *NQ* = 4.5 cm and the angle between *MP* and *NQ* = 60°.

We know that the diagonals of a parallelogram bisect each other.



Hence, *MNPQ* is the required parallelogram.

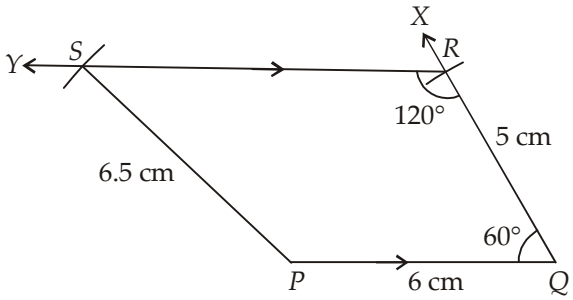
9. Given that : AB = 4.5 cm and diagonal AC = 6 cm.
Since, each side of a rhombus are equal. Therefore,
$AB = BC = CD = DA$ = 4.5 cm.



Hence, $ABCD$ is the required rhombus.

10. Given that : PQ = 6 cm, QR = 5 cm, PS = 6.5 cm and $\angle PQR = 60°$.
Since, $PQ \parallel SR$
Therefore,

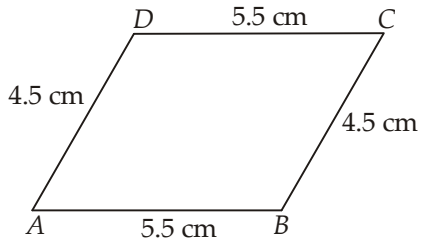
$$\angle Q + \angle R = 180° \quad \text{(Corresponding angles)}$$
$$\angle R = 180° - 60°$$
$$\angle R = 120°$$



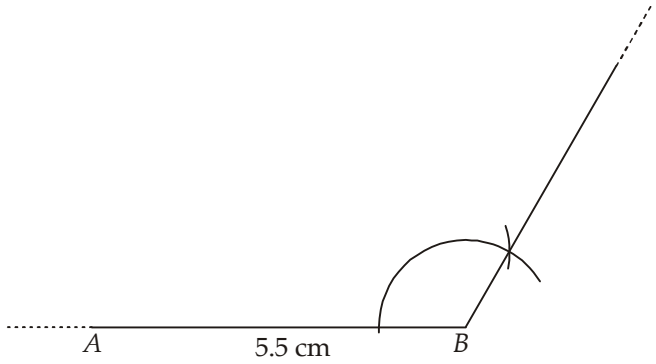
Hence, $PQRS$ is the required trapezium.

11. Given that : AB = 5.5 cm and BC = 4.5 cm.

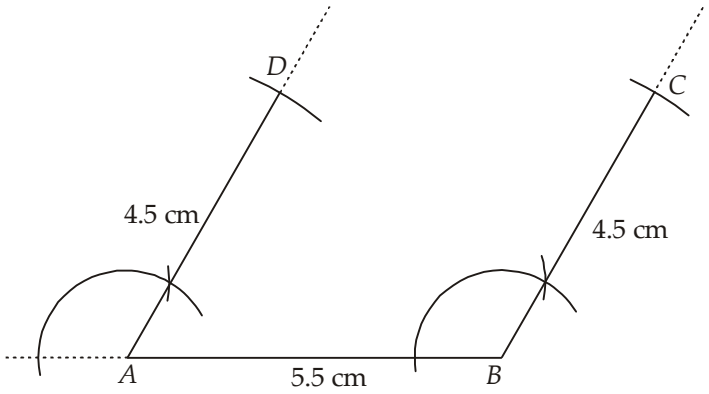
(*i*) A rough sketch of the parallelogram $ABCD$ is drawn as follows :



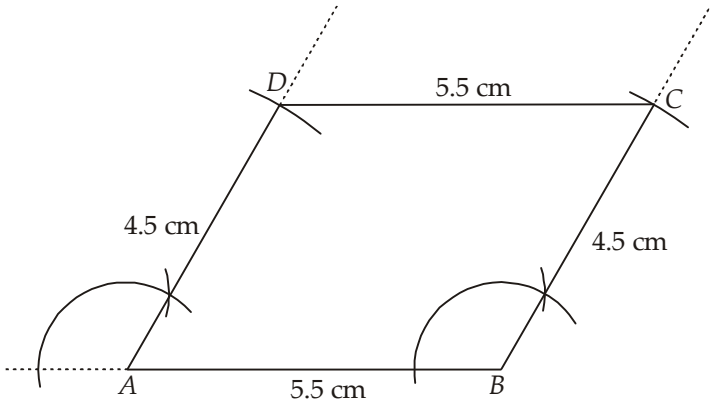
(*ii*) Draw a line segment AB of 5.5 cm and a ray at point B at a convenient angle.



(*iii*) Draw a ray at point A parallel to the ray at B. As the vertices, C and D are 4.5 cm away from the vertices B and A respectively, cut line segments BC and AD, each of 4.5 cm, from these rays.



(*iv*) Join D to C.

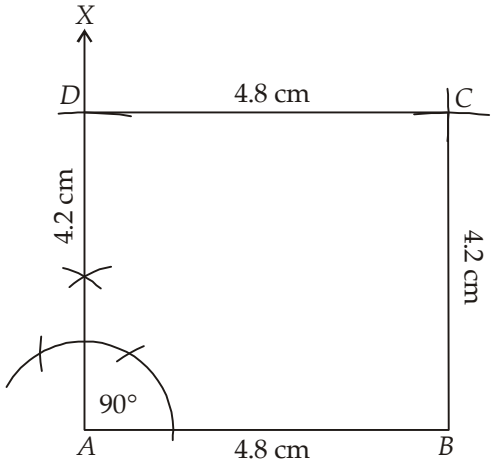


Hence, $ABCD$ is the required parallelogram.

12. Given that : Let *ABCD* be the required rectangle in which *AB* = 4.8 cm and *AD* = 4.2 cm.

Since, opposite sides of a rectangle are equal. Each angle of 90°.

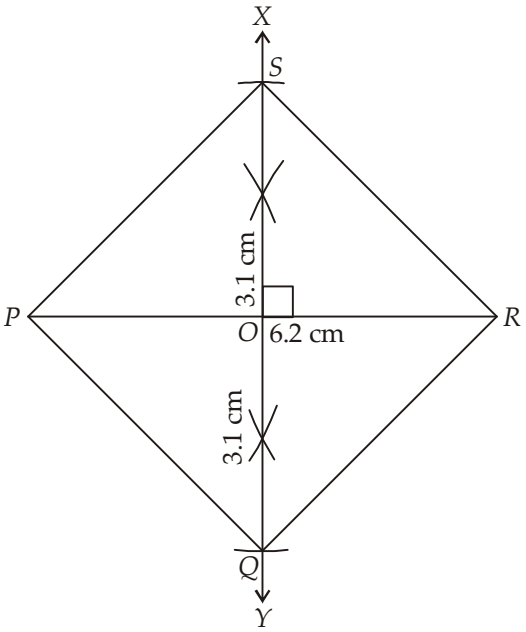
∴ *AB* = *CD* = 4.8 cm and *AD* = *BC* = 4.2 cm.



Hence, *ABCD* is the required rectangle.

13. Given that : *PQRS* is a square and its diagonals *PR* and *SQ* are 6.2 cm.

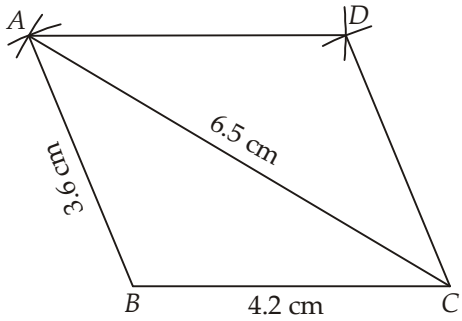
Since, diagonals of a square bisect each other at right angles.



Hence, *PQRS* is the required square.

14. Given that : *AB* = 3.6 cm, *BC* = 4.2 cm and *AC* = 6.5 cm.

We know that opposite sides of a prallelogram are equal.

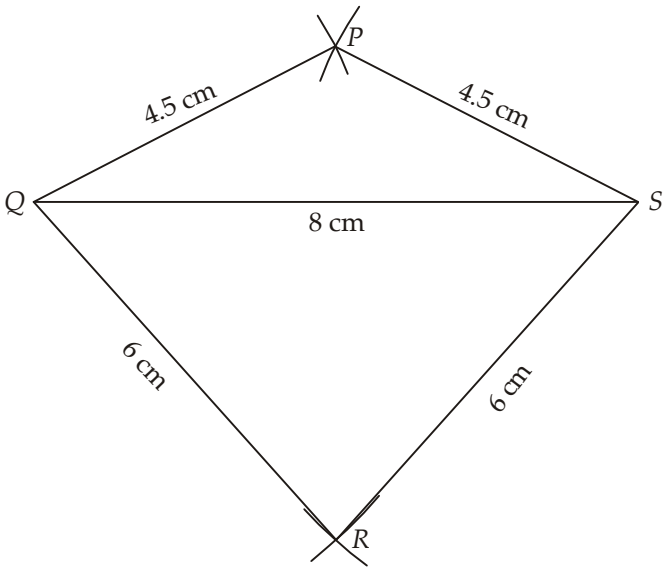


Hence, *ABCD* is the required parallelogram.

15. Given that : *QS* = 8 cm, *PS* = 4.5 cm and *RS* = 6 cm.

We know that, the pair of adjacent sides of a kite are equal.

∴ *PQ* = *PS* = 4.5 cm and *QR* = *RS* = 6 cm.



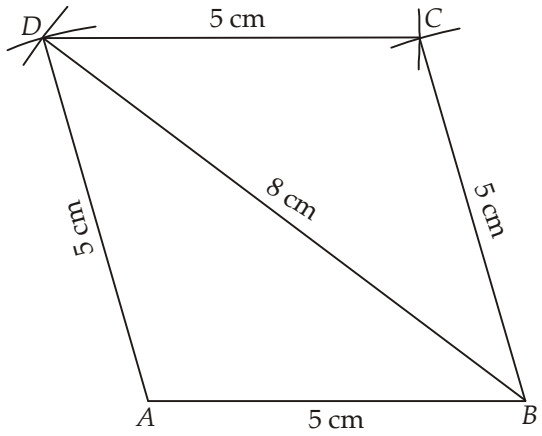
Hence, *PQRS* is the required kite.

HOTS QUESTIONS

1. Yes, we can construct a rhombus, if one side and one diagonal are given.

Since, each side of a rhombus are of equal length. Therefore, we have five elements to construct it. (Four sides and one diagonal)

Consider a rhombus *ABCD* whose side is 5 cm and one of its diagonals is 8 cm.



ABCD is the required rhombus.

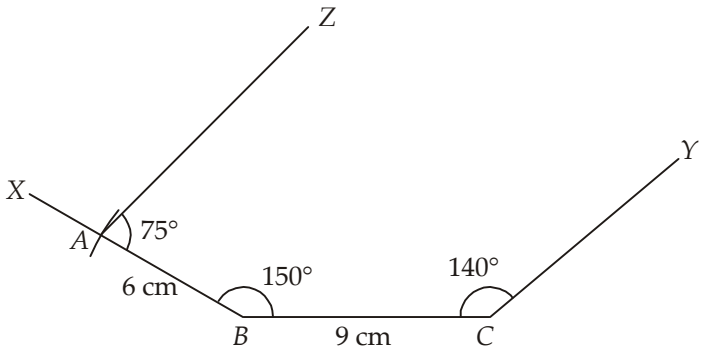
2. Given that : For a quadrilateral *ABCD*, *AB* = 6 cm, *BC* = 9 cm, $\angle A = 75°$, $\angle B = 150°$, $\angle C = 140°$.

Here, $\angle A + \angle B + \angle C = 75° + 150° + 140°$

$= 365° > 360°$

Since, sum of all angles of a quadrilateral is 360°, but in this case sum of three angles exceeds 360°.

Hence, It is not possible to construct a quadrilateral with these measurements.



We can see the figure in which *AZ* and *CY* never meet to form a quadrilateral.

Puzzle

Time interval from 20th October, at 1.00 a.m. to 22nd October, at 8.00 a.m. = 55 hours

It is given that the clock runs fast 4 seconds per hour.

In 55 hours, it will gain = 4 × 55 seconds

= 220 seconds

= 3 minutes 40 seconds

On 22nd October at 8.00 a.m.

It will show 08:03:40 *i.e.*, 8 hours 3 minutes 40 seconds.