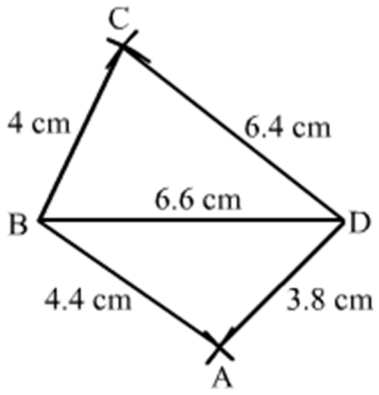
Exercise 18.1

Page Number: 18.4

Question 1:



First, we draw a rough sketch of the quadrilateral *ABCD* and write down its dimensions along the sides.

We may divide the quadrilateral into two constructible triangles *ABD* and *BCD*.

Solutions:

Steps of Construction:

Step I: Draw $BD = 6.6$ cm

Step II: With B as the center and radius $BC = 4$ cm, draw an arc.

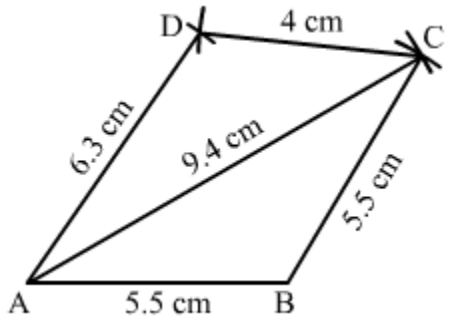
Step III: With D as the center and radius 6.4 cm, draw an arc to intersect the arc drawn in Step II at C.

Step IV: With *B* as the center and radius 4.4 cm, draw an arc on the side *BD* opposite to that of C.

Step V: With D as the center and radius 3.8 cm, draw an arc to intersect the arc drawn in Step IV at A.

Step VI: Join *BA, DA, BC* and *CD* The quadrilateral *ABCD* so obtained is the required quadrilateral.

Question 2:



Solutions:

Steps of construction:

Step I: Draw $AB = 5.5$ cm

Step II: With B as the center and radius $BC = 5.5$ cm, draw an arc.

Step III: With A as the center and radius $AC = 9.4$ cm, draw an arc to intersect the arc drawn in Step II at *C*.

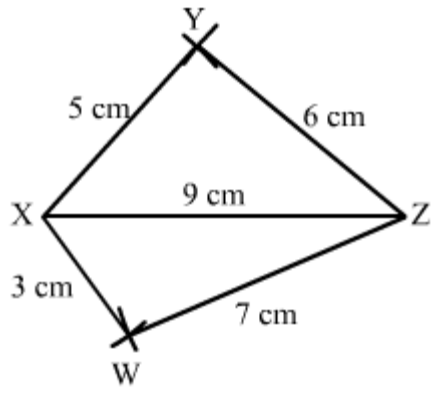
Step IV: With *C* as the center and radius $CD = 4$ cm, draw an arc.

Step V: With A as the center and radius $AD = 6.3$ cm, draw an arc to intersect the arc drawn in Step IV at *D*.

Step VI: Join *DA, BC, AC*, and *CD*.

The quadrilateral ABCD so obtained is the required quadrilateral.

Question 3:



Solutions:

Steps of construction:

Step I: Draw $XZ = 9$ cm

Step II: With *X* as the center and radius 5 cm, draw an arc above *XZ.*

Step III: With *Z* as the center and radius 6 cm, draw an arc to intersect the arc drawn in Step II at Y above *XZ.*

Step IV: With *Z* as the center and radius 7 cm, draw an arc below *XZ.*

Step V: With *X* as the center and radius 3 cm, draw an arc to intersect the arc drawn in Step *IV* at *W* below *XZ.*

Step VI: Join *XY, YZ, ZW,* and *XW.*

The quadrilateral *WXYZ* so obtained is the required quadrilateral.

Question 4:

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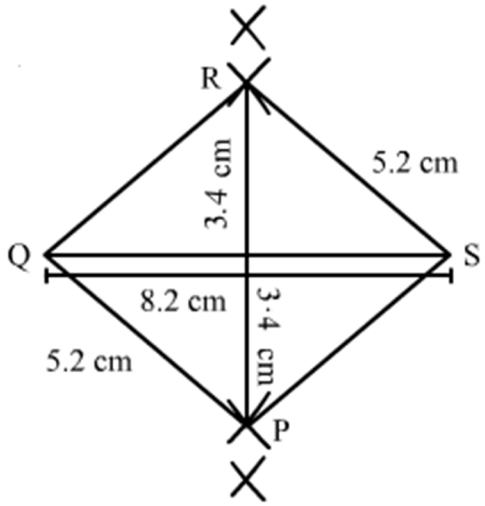


In a parallelogram opposite sides are equal.

Thus, we have to construct a quadrilateral *PQRS* in which $PQ = 5.2$ cm, $PR = 6.8$ cm and $QS = 8.2$ cm.

Solutions:

Steps of construction:

Step I: Draw $QS = 8.2$ cm

Step II: With *Q* as the center and radius 5.2 cm, draw an arc.

Step III: With *S* as the center and radius 5.2 cm, draw an arc to intersect the arc drawn in Step II at C.

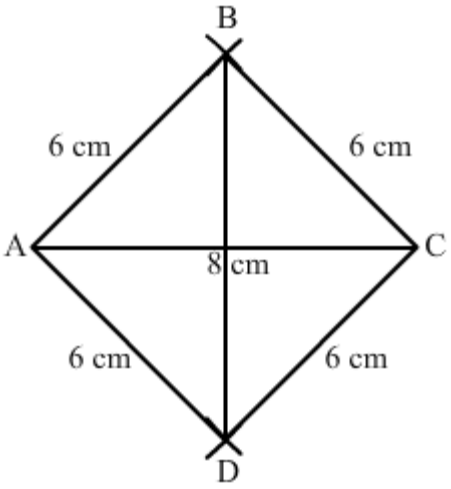
Step IV: With *P* as the center and radius 6.8 cm.

Step V: With *Q* as the center and radius 5.2 cm, draw an arc to intersect the arc drawn in Step *IV* at *A*.

Step VI: Join *QR, QP, PS*, and *SR.*

The quadrilateral *PQRS* so obtained is the required quadrilateral.

Question 5:



Solutions:

Steps of construction:

Step 1: Draw $AC = 8$ cm.

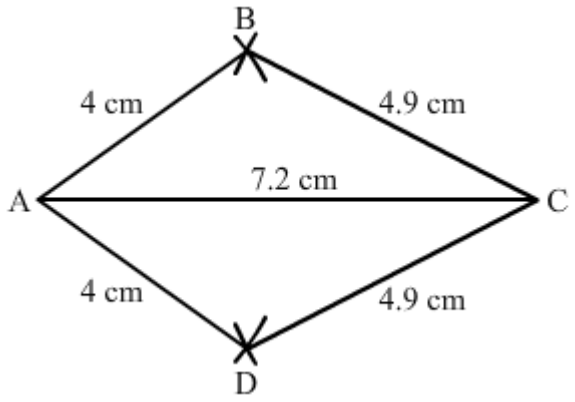
Step 2: With A as the centre and radius = 6 cm, draw arcs on both sides.

Step 3: With C as the center and radius = 6 cm, draw arcs on both sides, intersecting the previous arcs at points B and D.

Step 4: Join $BD = 8.9$ cm.

Thus, $ABCD$ is the required rhombus.

Question 6:



Solutions:

Steps of construction:

Step I: Draw $AC = 7.2$ cm.

Step II: With *A* as the centre and radius 4cm, draw arcs on both sides of the line segment *AC*.

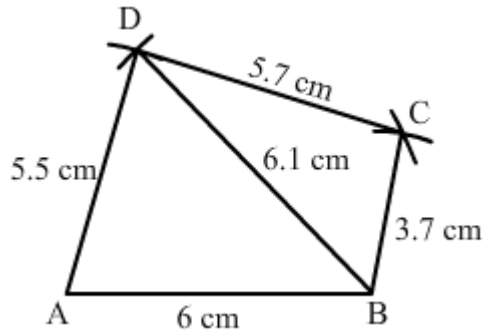
Step III: With *C* as the centre and radius 4.9 cm, draw arcs on both sides of *AC* intersecting the previous arcs of step II at *B* and *D*.

Step IV: Join *BA, DA, BC* and *CD*.

Thus, the quadrilateral *ABCD* so obtained is the required kite.

Question 7:

cannot.



Solutions:

Steps of construction:

Step I: Draw $AB = 6$ cm.

Step II: With A as the center and radius 5.5 cm, draw an arc.

Step III: With *B* as the center and radius 6.1 cm, draw an arc to intersect the arc drawn in Step II at *D*.

Step IV: With *B* as the centre and radius 3.7 cm, draw an arc on the side.

Step V: With *D* as the centre and radius 5.7 cm, draw an arc to intersect the arc drawn in Step IV at *C*.

Step VI: Join *BD, DA, BC* and *CD*.

The quadrilateral *ABCD* so obtained is the required quadrilateral.

Question 8:

Such a quadrilateral cannot be constructed because, in a triangle, the sum of the length of its two sides must be greater than that of the third side

But here in triangle *ACD,*

$AD + CD = 5.5 + 3 = 8.5$ cm

and $AC = 11$ cm

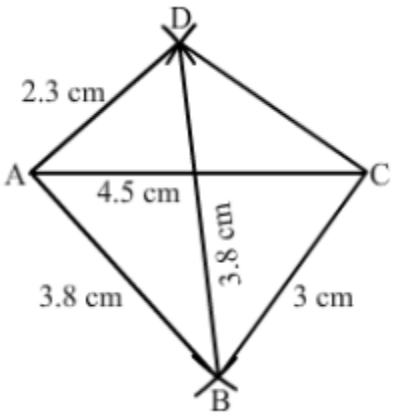
i.e., $AD + CD < AC$, which is not possible.

So, the construction is not possible.

Exercise 18.2

Page Number: 18.6

Question 1:



Solutions:

Steps of construction:

Step I: Draw $AC = 6$ cm.

Step II: With *A* as the center and radius 3.8 cm, draw an arc.

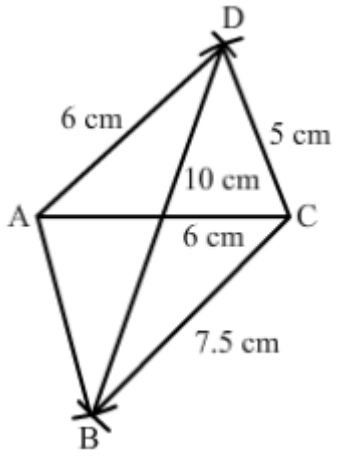
Step III: With *C* as the center and radius 3.0 cm, draw an arc to intersect the arc drawn in Step II at *B*.

Step IV: With *B* as the center and radius 3.8 cm, draw an arc on the other side of *AC*.

Step V: With *A* as the center and radius 2.3 cm, draw an arc to intersect the arc drawn in Step IV at *D*.

Step VI: Join *BA, DA, BC* and *CD* to obtain the required quadrilateral.

Question 2:



Solutions:

Steps of construction:

Step I: Draw $AC = 6$ cm.

Step II: With *A* as the center and radius 6 cm, draw an arc.

Step III: With *C* as the center and radius 5 cm, draw an arc to intersect the arc drawn in Step II at *D*.

Step IV: With *D* as the center and radius 10 cm, draw an arc on the other side of the line segment AC.

Step V: With *C* as the center and radius 7.5 cm, draw an arc to intersect the arc drawn in Step IV at *B*.

Step VI: Join *BA, DA, BC* and *CD* to obtain the required quadrilateral.

Question 3:

If we consider a triangle ABD from the given data, then

$AB = 3$ cm

$BD = 4$ cm

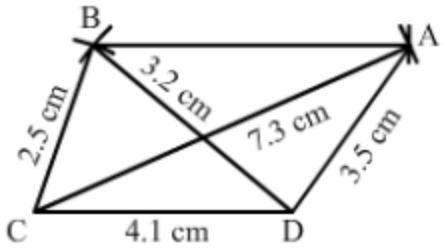
$AD = 7.5$ cm

$AB + BD = 3 + 4 = 7$ cm

However, we know that the sum of the lengths of two sides of a triangle is always greater than the third side.

Therefore, construction is not possible from the given data.

Question 4:



Solutions:

Steps of construction:

Step I: Draw $CD = 4.1$ cm.

Step II: With *C* as the center and radius 7.3 cm, draw an arc.

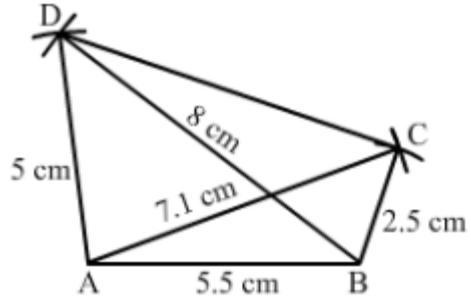
Step III: With *D* as the center and radius 3.5 cm, draw an arc to intersect the arc drawn in Step II at *A*.

Step IV: With *D* as the center and radius 3.2 cm, draw an arc on the other side of *AC*.

Step V: With *C* as the center and radius 2.5 cm, draw an arc to intersect the arc drawn in Step IV at *B*.

Step VI: Join *BA, DA, BC and BD* and *AC* to obtain the required quadrilateral.

Question 5:



Solutions:

Steps of construction:

Step I: Draw $AB = 5.5$ cm.

Step II: With *A* as the center and radius 7.1 cm, draw an arc.

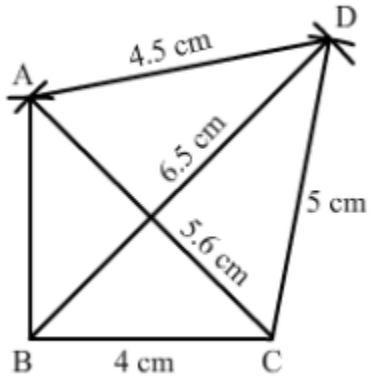
Step III: With *B* as the center and radius 2.5 cm, draw an arc to intersect the arc drawn in Step II at *C*.

Step IV: With *B* as the center and radius 8 cm, draw an arc.

Step V: With *A* as the center and radius 5 cm, draw an arc to intersect the arc drawn in Step IV at *D*.

Step VI: Join *DA, DB, BC, AC,* and *CD* to obtain the required quadrilateral.

Question 6:



Solutions:

Steps of construction:

Step I: Draw $BC = 4$ cm.

Step II: With *B* as the center and radius 6.5 cm, draw an arc.

Step III: With *C* as the center and radius 5 cm, draw an arc to intersect the arc drawn in Step II at *D*.

Step IV: With *C* as the center and radius 5.6 cm, draw an arc on the same side

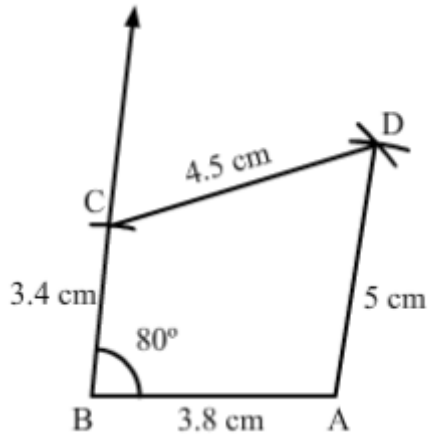
Step V: With *D* as the center and radius 4.5 cm, draw an arc to intersect the arc drawn in Step IV at *A*.

Step VI: Join *BA, AC, DA, BD,* and *CD* to obtained the required quadrilateral.

Exercise 18.3

Page Number: 18.7

Question 1:



Solutions:

Steps of construction:

Step I: Draw $AB = 3.8$ cm.

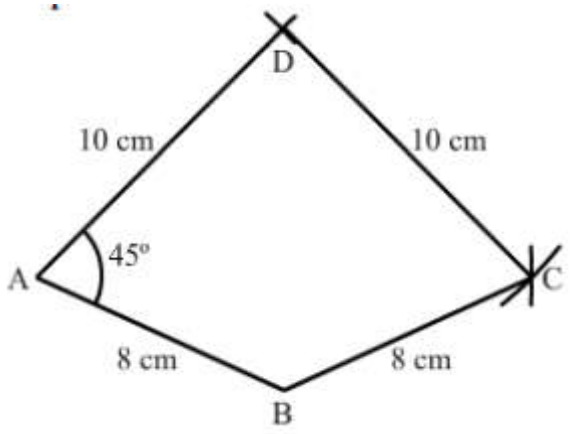
Step II: Construct $\angle ABC = 80°$.
Step III: With B as the center and radius 3.4 cm, cut off $BC = 3.4$ cm.

Step IV: With C as the center and radius 4.5 cm, draw an arc.

Step V: With A as the center and radius 5.3 cm, draw an arc to intersect the arc drawn in Step IV at D.

Step VI: Join AD, BC and CD to obtain the required quadrilateral.

Question 2:



Solutions:

Steps of construction:

Step I: Draw $AB = 8$ cm.

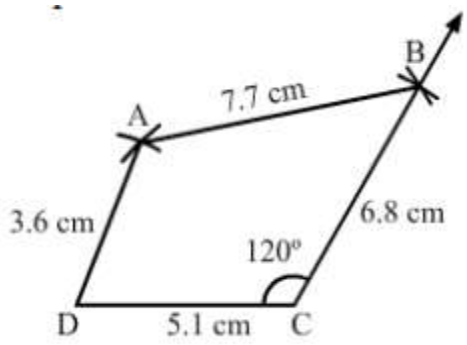
Step II: Construct $\angle BAD = 45°$.
Step III: With A as the centre and radius 10 cm, cut off $AD = 10$ cm.

Step IV: With D as the centre and radius 10 cm, draw an arc.

Step V: With B as the centre and radius 8 cm, draw an arc to intersect the arc drawn in Step IV at C.

Step VI: Join BC and CD to obtain the required quadrilateral.

Question 3:



Solutions:

Steps of construction:

Step I: Draw $DC = 5.1$ cm.

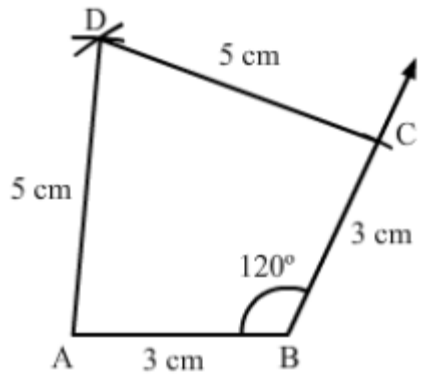
Step II: Construct $\angle DCB = 120°$.
Step III: With C as the center and radius 6.8 cm, cut off $BC = 6.8$ cm.

Step IV: With B as the center and radius 7.7 cm, draw an arc.

Step V: With D as the center and radius 3.6 cm, draw an arc to intersect the arc drawn in Step IV at A.

Step VI: Join AB and AD to obtain the required quadrilateral.

Question 4:



Solutions:

Steps of construction:

Step I: Draw $AB = 3$ cm.

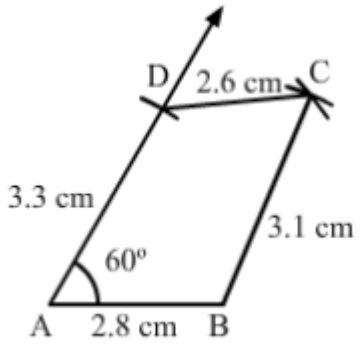
Step II: Construct $\angle ABC = 120°$.
Step III: With B as the center and radius 3 cm, cut off $BC = 3$ cm.

Step IV: With C as the center and radius 5 cm, draw an arc.

Step V: With A as the center and radius 5 cm, draw an arc to intersect the arc drawn in Step IV at D.

Step VI: Join AD and CD to obtain the required quadrilateral.

Question 5:



Solutions:

Steps of construction:

Step I: Draw $AB = 2.8$ cm.

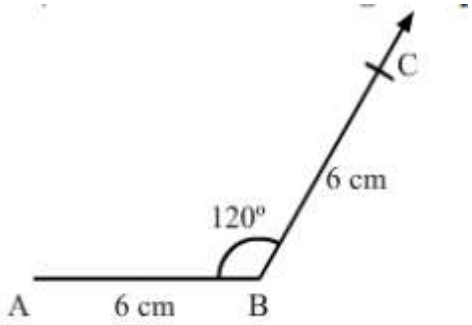
Step II: Construct $\angle BAD = 60°$.
Step III: With A as the center and radius 3.3 cm, cut off $AD = 3.3$ cm.

Step IV: With D as the center and radius 2.6 cm, draw an arc.

Step V: With B as the center and radius 3.1 cm, draw an arc to intersect the arc drawn in Step IV at C.

Step VI: Join BC and CD to obtain the required quadrilateral.

Question 6:



Solutions:

Steps of construction:

Step I: Draw $AB = 6$ cm.

Step II: Construct $\angle ABC = 120°$.
Step III: With B as the centre and radius 6 cm, cut off $BC = 6$ cm. Now, we can see that AC is about 10.3 cm which is greater than $AD + CD = 4.5 + 4.5 = 9$ cm.

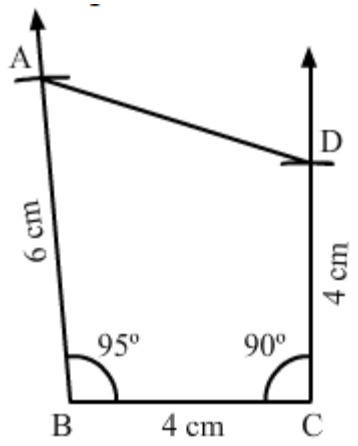
We know that sum of the lengths of two sides of the triangle is always greater than the third side but here, the sum of AD and CD is less than AC.

So, construction of the given quadrilateral is not possible.

Exercise 18.4

Page Number: 18.10

Question 1:



Solutions:

Steps of construction:

Step I: Draw $BC = 4$ cm.

Step II: Construct $\angle ABC = 95°$ at B.

Step III: With B as the center and radius 6 cm, cut off $BA = 6$ cm.

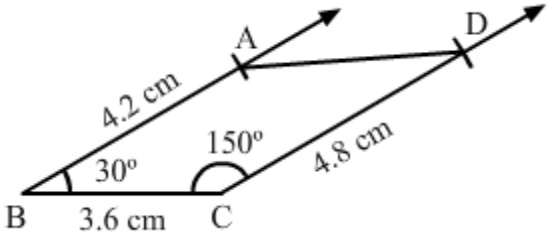
Step IV: Construct $\angle BCD = 90°$ at C.

Step V: With C as the center and radius 4 cm, cut off $BA = 4$ cm.

Step VI: Join CD.

The quadrilateral so obtained is the required quadrilateral.

Question 2:



Solutions:

Steps of construction:

Step I: Draw $BC = 3.6$ cm.

Step II: Construct $\angle ABC = 30°$ at B.

Step III: With B as the center and radius 4.2 cm, cut off $BA = 4.2$ cm.

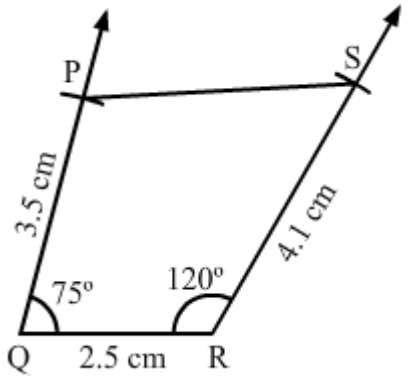
Step IV: Construct $\angle BCD = 150°$ at C.

Step V: With C as the center and radius 4.8 cm, cut off $CD = 4.8$ cm.

Step VI: Join AD.

The quadrilateral so obtained is the required quadrilateral.

Question 3:



Solutions:

Steps of construction:

Step I: Draw $QR = 2.5$ cm.

Step II: Construct $\angle PQr = 75°$ at Q.

Step III: With Q as the center and radius 3.5 cm, cut off $QP = 3.5$ cm.

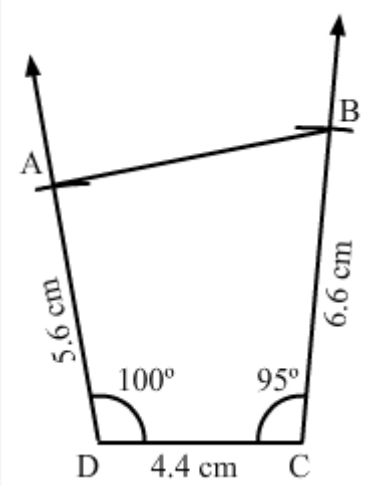
Step IV: Construct $\angle QRS = 120°$ at R.

Step V: With R as the center and radius 4.1 cm, cut off $RS = 4.1$ cm.

Step VI: Join PS.

The quadrilateral so obtained is the required quadrilateral.

Question 4:



Solutions:

Steps of construction:

Step I: Draw DC = 4.4 cm.

Step II: Construct $\angle ADC = 100°$ at D.

Step III: With D as the center and radius 5.6 cm, cut off $DA = 5.6$ cm.

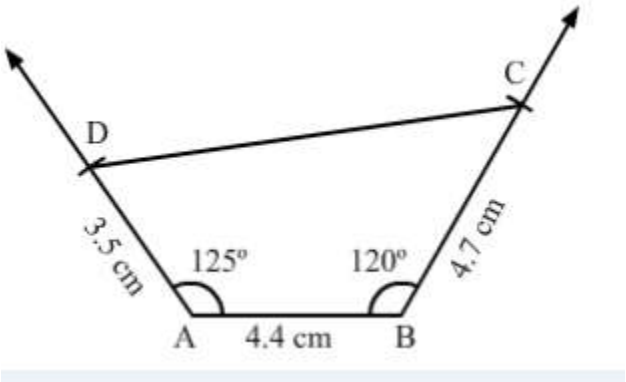
Step IV: Construct $\angle BCD = 95°$ at C.

Step V: With C as the center and radius 6.6 cm, cut off $CB = 6.6$ cm.

Step VI: Join AB.

The quadrilateral so obtained is the required quadrilateral.

Question 5:



Solutions:

Steps of construction:

Step I: Draw $AB = 4.4$ cm.

Step II: Construct $\angle BAD = 125°$ at A.

Step III: With A as the centre and radius 3.5 cm, cut off $AD = 3.5$ cm.

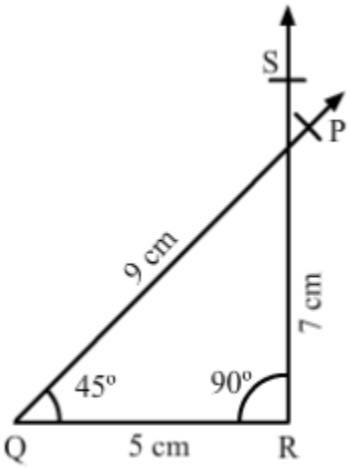
Step IV: Construct $\angle ABC = 125°$ at B.

Step V: With B as the centre and radius 4.7 cm, cut off $BC = 4.7$ cm.

Step VI: Join CD.

The quadrilateral so obtained is the required quadrilateral.

Question 6:



Solutions:

Steps of construction:

Step I: Draw $QR = 5$ cm.

Step II: Construct $\angle PQR = 45°$ at Q.

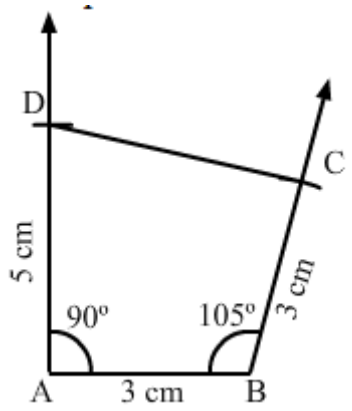
Step III: With Q as the center and radius 9 cm, cut off $QP = 9$ cm.

Step IV: Construct $\angle QRS = 90°$ at R.

Step V: With R as the center and radius 7 cm, cut off $RS = 7$ cm.

Since, the line segment PQ and RS intersect each other, the quadrilateral cannot be constructed.

Question 7:



Solutions:

Steps of construction:

Step I: Draw $AB = 3$ cm.

Step II: Construct $\angle DAB = 90°$ at A.

Step III: With A as the center and radius 5 cm, cut off $AD = 5$ cm.

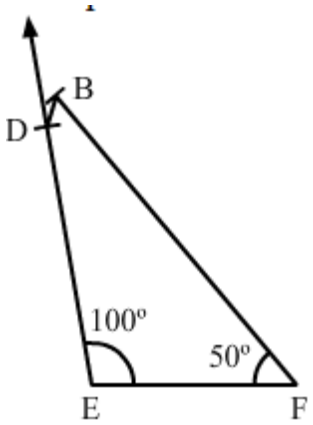
Step IV: Construct $\angle ABC = 105°$ at B.

Step V: With B as the center and radius 3 cm, cut off $BC = 3$ cm.

Step VI: Join CD.

The quadrilateral so obtained is the required quadrilateral.

Question 8:



Solutions:

Steps of construction:

Step I: Draw $EF = 3.5$ cm.

Step II: Construct $\angle DEF = 100°$ at E.

Step III: With E as the center and radius 4.5 cm, cut off $DE = 4.5$ cm.

Step IV: Construct $\angle EFB = 50°$ at F.

Step V: With F as the center and radius 6.5 cm, cut off $FB = 6.5$ cm.

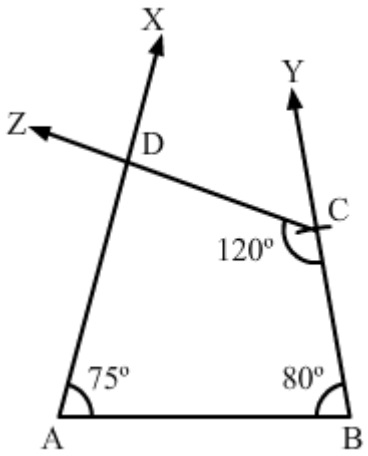
Step VI: Join BD.

The quadrilateral so obtained is the required quadrilateral.

Exercise 18.5

Page Number: 18.13

Question 1:



Solutions:

Steps of construction:

Step I: Draw $AB = 4$ cm.

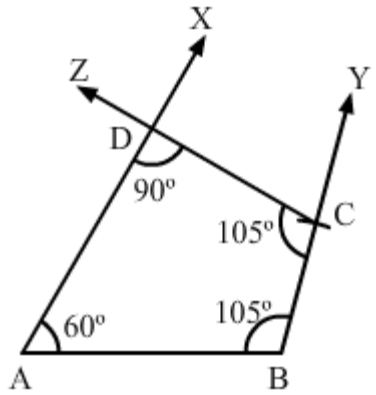
Step II: Construct $\angle XAB = 75°$ at A and $\angle ABY = 80°$ at B.

Step III: With B as the center and radius 3 cm, cut off $BC = 3$ cm.

Step IV: At C, draw $\angle BCZ = 120°$ such that it meets AX at D.

The quadrilateral so obtained is the required quadrilateral.

Question 2:



We know that the sum of all the angles in a quadrilateral is 360.

i.e. $\angle A + \angle B + \angle C + \angle D = 360°$

$\angle C = 105°$

Solutions:

Steps of construction:

Step I: Draw $AB = 5.5$ cm.

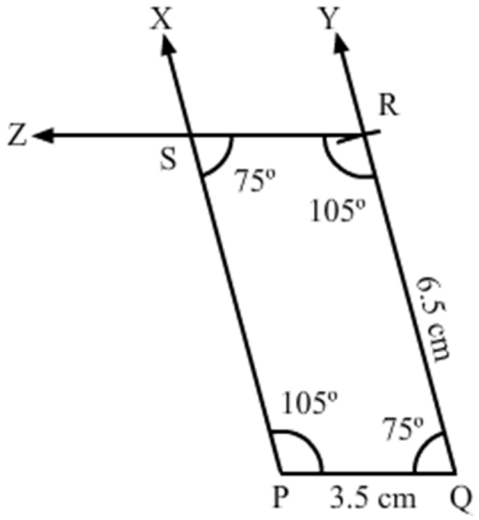
Step II: Construct $\angle XAB = 60°$ at A and $\angle ABY = 105°$.

Step III: With B as the center and radius 3.7 cm, cut off $BC = 3.7$ cm.

Step IV: At C, draw $\angle BCZ = 105°$ such that it meets AX at D.

The quadrilateral so obtained is the required quadrilateral.

Question 3:



We know that the sum of all the angles in a quadrilateral is 360.

i.e., $\angle P + \angle Q + \angle R + \angle S = 360°$

$\angle Q = 75°$

Solutions:

Steps of construction:

Step I: Draw $PQ = 3.5$ cm.

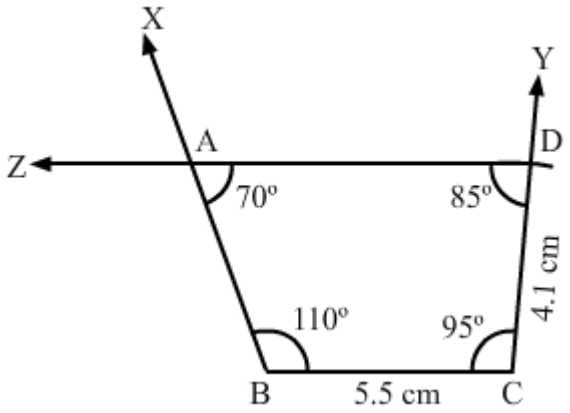
Step II: Construct $\angle XPQ = 75°$ at P and $\angle PQY = 75°$ at Q.

Step III: With Q as the center and radius 6.5 cm, cut off $QR = 6.5$

Step IV: At R, draw $\angle QRZ = 105°$ such that it meets PX at S.

The quadrilateral so obtained is the required quadrilateral.

Question 4:



We know that the sum of all the angles in a quadrilateral is 360. i.e.

i.e. $\angle A + \angle B + \angle C + \angle D = 360°$

$\angle C = 95°$

Solutions:

Steps of construction:

Step I: Draw $BC = 5.5$ cm.

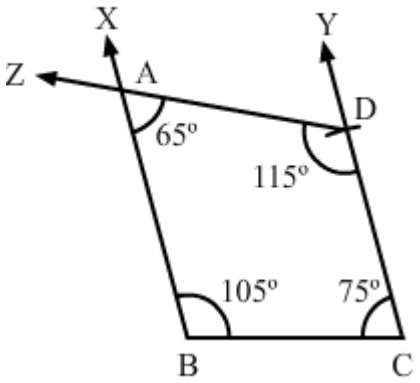
Step II: Construct $\angle XBC = 110°$ at A and $\angle BCY = 95°$.

Step III: With C as the center and radius 4.1 cm, cut off $CD = 4.1$ cm.

Step IV: At D, draw $\angle CDZ = 85°$ such that it meets BY at A.

The quadrilateral so obtained is the required quadrilateral.

Question 5:



We know that the sum of all the angles in a quadrilateral is 360. i.e

i.e. $\angle A + \angle B + \angle C + \angle D = 360°$

$\angle D = 115°$

Solutions:

Steps of Construction:

Step I: Draw $BC = 5.7$ cm.

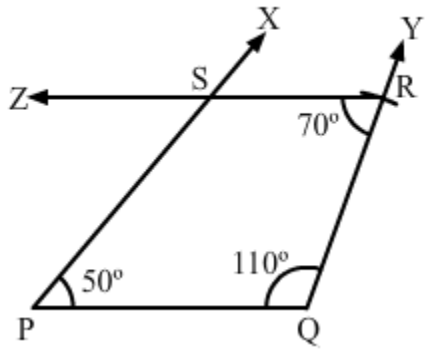
Step II: Construct $\angle XBC = 105°$ at B and $\angle BCY = 105°$ at C.

Step III: With C as the center and radius 6.8 cm, cut off $CD = 6.8$ cm.

Step IV: At D, draw $\angle CDZ = 115°$ such that it meets BY at A.

The quadrilateral so obtained is the required quadrilateral.

Question 6:



Solutions:

Steps of construction:

Step I: Draw $PQ = 4$ cm.

Step II: Construct $\angle XPQ = 50°$ at P and $\angle PQY = 110°$ at Q.

Step III: With Q as the center and radius 5 cm, cut off $QR = 5$ cm.

Step IV: At R, draw $\angle QRZ = 70°$ such that it meets PX at S.

The quadrilateral so obtained is the required quadrilateral.