CBSE NCERT Solutions for Class 8 Mathematics Chapter 4

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1. Construct the following quadrilaterals.

(i) Quadrilateral ABCD
   \[
   AB = 4.5 \text{ cm}, \\
   BC = 5.5 \text{ cm}, \\
   CD = 4 \text{ cm}, \\
   AD = 6 \text{ cm}, \\
   AC = 7 \text{ cm}
   \]

(ii) Quadrilateral JUMP
   \[
   JU = 3.5 \text{ cm}, \\
   UM = 4 \text{ cm}, \\
   MP = 5 \text{ cm}, \\
   PJ = 4.5 \text{ cm}, \\
   PU = 6.5 \text{ cm}
   \]

(iii) Parallelogram MORE
   \[
   OR = 6 \text{ cm}, \\
   RE = 4.5 \text{ cm}, \\
   EO = 7.5 \text{ cm}
   \]

(iv) Rhombus BEST
   \[
   BE = 4.5 \text{ cm}, \\
   ET = 6 \text{ cm}
   \]

Solution:

Given,
\[
AB = 4.5 \text{ cm}, BC = 5.5 \text{ cm}, CD = 4 \text{ cm}, AD = 6 \text{ cm} \quad \text{and} \quad AC = 7 \text{ cm}
\]

(a) Draw a rough sketch which will help us to visualize the quadrilateral. We draw this first and mark measurements:
(b) Draw BC = 5.5 cm. Now with B as the center draw an arc of 4.5 cm and with C as the center draw an arc of 7 cm. Mark the point of intersection as A.

(c) Given that AD is 6 cm, draw an arc of radius 6 cm from point A as the center.

(d) Now with C as the center draw an arc of radius 4 cm such that it cuts the previous arc. Call this point of intersection as D.

Hence, ABCD is the required quadrilateral.
(ii) Given, $JU = 3.5\, \text{cm}, \, UM = 4\, \text{cm}, \, MP = 5\, \text{cm}, \, PJ = 4.5\, \text{cm}$ and $PU = 6.5\, \text{cm}$

(a) Draw a rough sketch which will help us to visualize the quadrilateral. We draw this first and mark measurements.

(b) Draw the base line $PU = 6.5\, \text{cm}$. Now with $P$ as the center draw an arc of radius $4.5\, \text{cm}$ and with $U$ as the center draw an arc of radius $3.5\, \text{cm}$ such that it cuts the previously drawn arc. Name this point of intersection as $J$.

(c) Given that the point $M$ is at a distance of $4\, \text{cm}$ and $5\, \text{cm}$ from $U$ and $P$ respectively, draw arcs of radius $4\, \text{cm}$ and $5\, \text{cm}$ from $U$ and $P$. The point of intersection is $M$.

(d) Join $PM$ and $UM$
(iii) Given, \( OR = 6 \text{ cm}, \ RE = 4.5 \text{ cm} \) and \( EO = 7.5 \text{ cm} \)

(a) The opposite sides of a parallelogram are equal and parallel. Therefore, \( ME = OR \) and \( MO = ER \). Draw a rough sketch which will help us to visualize the parallelogram:

(b) Construct \( OR = 6 \text{ cm} \). Now with \( O \) and \( R \) as centers draw arcs of radius 7.5 cm and 4.5 cm respectively. Name the point of intersection as \( E \).

(c) Construct arcs of radius 4.5 cm and 6 cm from \( O \) and \( E \) respectively. The point of intersection is named as \( M \).

(d) Join OM and EM

JUMP is the required quadrilateral.
Therefore, MORE is the required parallelogram.

(iv) Given, \(BE = 4.5\) cm and \(ET = 6\) cm

(a) Since all the sides of a rhombus measure the same, \(BE = ES = ST = TB\).

Draw a rough sketch which will help us to visualize the rhombus.

(b) Construct \(ET = 6\) cm. Now with \(E\) and \(F\) as the centers construct arcs of radius \(4.5\) cm from each respectively. The point of intersection is named as \(B\).

(c) Since point \(S\) is \(4.5\) cm away from \(E\) and \(T\) respectively, construct arcs of \(4.5\) cm from \(E\) and \(T\) and the point of intersection gives \(S\).

(d) Join \(ES\) and \(TS\)
Hence, BEST is the required rhombus.

**EXERCISE 4.2**

1. Construct the following quadrilaterals.
   
   (i) Quadrilateral LIFT
       - LI = 4 cm
       - IF = 3 cm
       - TL = 2.5 cm
       - LF = 4.5 cm
       - IT = 4 cm
   
   (ii) Quadrilateral GOLD
       - OL = 7.5 cm
       - GL = 6 cm
       - GD = 6 cm
       - LD = 5 cm
       - OD = 10 cm
   
   (iii) Rhombus BEND
       - BN = 5.6 cm
       - DE = 6.5 cm

**Solution:**

(i) Given, LI = 4 cm, IF = 3 cm, TL = 2.5 cm, LF = 4.5 cm and IT = 4 cm

(a) Draw the rough sketch of the quadrilateral LIFT. Now we can easily see that it is possible to draw ΔLTI first.
(b) Draw \( \triangle LTI \) using SSS construction. So \( \triangle LTI \) is constructed with the given measurements as shown.

(c) Construct arcs of radius 4.5 cm and 3 cm with centers L and I respectively. The point of intersection is F.

(d) Join FT and IF to obtain the required quadrilateral.

Hence, LIFT is the required quadrilateral.

(ii) Given, \( OL = 7.5 \text{ cm}, GL = 6 \text{ cm}, GD = 6 \text{ cm}, LD = 5 \text{ cm} \) and \( OD = 10 \text{ cm} \)
(a) Draw the rough sketch of the quadrilateral LIFT. Now we can easily see that it is possible to draw \( \triangle DGL \) first.

(b) Draw \( \triangle DGL \) using SSS construction. So \( \triangle DGL \) is constructed with the given measurements as shown.

(c) With D and L as the centers construct arcs of 10 cm and 7.5 cm respectively. The point of intersection is named as O.

(d) Join O to G, D and L to obtain the required quadrilateral.

Therefore, GOLD is the required quadrilateral.

(iii) Given, \( BN = 5.6 \) cm and \( DE = 6.5 \) cm
(a) The diagonals of a rhombus bisect each other at $90^\circ$. Let us assume $O$ to be the point of intersection. Then $EO = OD = 3.25\text{cm}$. The rough sketch is as shown below:

(b) Draw $BN = 5.6\text{ cm}$ and construct its perpendicular bisectors. Name the point at which it intersects $BN$ to be $O$.

(c) With $O$ as the center draw arcs of $3.25\text{ cm}$ such that they intersect the perpendicular bisector at point $D$ and $E$ respectively.
(d) Join BD, DN, BE and EN to obtain the required rhombus BEND.

Hence, the above figure is the required rhombus.

EXERCISE 4.3

1. Construct the following quadrilaterals.
   (i) Quadrilateral MORE
       MO = 6 cm
       OR = 4.5 cm
       ∠M = 60°
       ∠O = 105°
       ∠R = 105°
   (ii) Quadrilateral PLAN
PL = 4 cm
LA = 6.5 cm
∠P = 90°
∠A = 110°
∠N = 85°

(iii) Parallelogram HEAR
∠R = 85°
EA = 6 cm
HE = 5 cm

(iv) Rectangle OKAY
OK = 7 cm
KA = 5 cm

Solution:

(i) Given, MO = 6 cm, OR = 4.5 cm, ∠M = 60°, ∠O = 105° and ∠R = 105°

(a) Draw a rough sketch which will help us to visualize the quadrilateral.

(b) Start with taking MO = 6 cm on O and a line segment of 105 degrees from O. Given that OR = 4.5 cm, cut an arc of 4.5 cm and locate R with O as the center.
(c) Draw an angle of 105° from R and draw a line.

(d) Draw a ray of 60° from M and extend it to meet the ray starting from R. The point of intersection gives E.

Hence, MORE is the required quadrilateral.

(ii) Given, PL = 4 cm, LA = 6.5 cm, ∠P = 90°, ∠A = 110° and ∠N = 85°
Using angle sum property of a quadrilateral,

\[ \angle P + \angle L + \angle A + \angle N = 360^\circ \]

Which gives \( \angle L = 75^\circ \)

(a) Draw a rough sketch which will help us to visualize the quadrilateral.

(b) Draw PL = 4 cm and construct an angle of 75° from point L. Cut an arc of 6.5 cm on the ray and name the point as A.

(c) Draw an angle of 110 degrees at point A and draw a line.
(d) Draw a ray at an angle of $90^\circ$ from $P$ and let it meet the ray from $A$ at $N$

Hence, PLAN is the required quadrilateral.

(iii) Given, $\angle R = 85^\circ$, $EA = 6\text{ cm}$ and $HE = 5\text{ cm}$

(a) Draw a rough sketch which will help us to visualize the parallelogram.

(b) Construct $HE = 5\text{ cm}$ and an angle of $85^\circ$ at $E$. Since $AE$ is given to be $6\text{ cm}$, cut an arc of $6\text{ cm}$ on the ray from $E$ and the point obtained will be named as $A$. 
(c) Draw arcs of radius 6 cm and 5 cm from H and A respectively. Name the point of intersection as R.

Join R to H and A to obtain the required parallelogram HEAR.

Hence, the above figure is the required parallelogram.

(iv) Given, OK = 7 cm and KA = 5 cm

(a) Draw a rough sketch which will help us to visualize the rectangle OKAY.
(b) Draw \(KO = 7\text{cm}\) and an angle of \(90^\circ\) at \(K\). Given that \(AK = 5\text{cm}\), cut an arc of \(5\text{cm}\) on the ray drawn from \(K\) and name the point \(A\).

(c) Draw arcs of radius \(5\text{cm}\) and \(7\text{cm}\) from \(O\) and \(A\) respectively. The point of intersection gives \(Y\).

Join \(AY\) and \(OY\) to obtain the required rectangle \(OKAY\).

Therefore, the above figure is the required rectangle.

**EXERCISE 4.4**

1. Construct the following quadrilaterals.

   (i) Quadrilateral DEAR
   
   \[DE = 4\text{ cm}\]
   \[EA = 5\text{ cm}\]
   \[AR = 4.5\text{ cm}\]
∠E = 60°
∠A = 90°

(ii) Quadrilateral TRUE
TR = 3.5 cm
RU = 3 cm
UE = 4 cm
∠R = 75°
∠U = 120°

Solution:
(i) Given, DE = 4 cm, EA = 5 cm, AR = 4.5 cm, ∠E = 60° and ∠A = 90°

(a) Draw a rough sketch which will help us to visualize the quadrilateral DEAR.

(b) Draw DE = 4 cm and an angle of 60° at E. Cut an arc of 5 cm on the ray extended from E and name this point as A.

(c) Draw an angle of 90° at A and cut an arc of 4.5 cm on the ray extended from A. Name this point as R.
(d) Join RD to obtain the required quadrilateral DEAR.

Hence, DEAR is the required quadrilateral.

(ii) Given, TR = 3.5 cm, RU = 3 cm, UE = 4 cm, ∠R = 75° and ∠U = 120°

(a) Draw a rough sketch which will help us to visualize the quadrilateral TRUE.

(b) Draw RU = 3 cm and an angle of 120° at U. Cut an arc of 4 cm on the ray extending from U and name this point as E.
(c) Next draw an angle of $75^\circ$ at R and cut an arc of 3.5 cm on the ray extending from this and name this point as T.

(d) Join TE to obtain the required quadrilateral TRUE.

Hence, the above figure is the required quadrilateral.

EXERCISE 4.5

1. Draw the following.
   (i) The square READ with RE = 5.1 cm.
   (ii) A rhombus whose diagonals are 5.2 cm and 6.4 cm long.
   (iii) A rectangle with adjacent sides of lengths 5 cm and 4 cm
(iv) A parallelogram OKAY where OK = 5.5 cm and KA = 4.2 cm. Is it unique?

**Solution:**

(i) Given, RE = 5.1 cm

All the sides of a square measure the same and each of the angle measure 90°.

(a) Draw a rough sketch which will help us to visualize the square read.

(b) Draw RE = 5.1 cm and an angle of 90° at R and E respectively.

Cut arcs of 5.1 cm from R and E such that they intersect the ray extending from them at D and A respectively.

Join DA to obtain the required square READ.
Hence, the above figure is the required square.

(ii) Given, diagonals are 5.2 cm and 6.4 cm long

In a rhombus, the diagonals bisect each other at 90°.

(a) Draw a rough sketch which will help us to visualize the rhombus ABCD.

(b) Draw $AC = 5.2$ cm and construct the perpendicular bisectors. Let it intersect $AC$ at point $O$.

(c) Draw arcs of 3.2 cm on both the sides of this perpendicular bisector and name it D and B as shown.
Join B and D to A and C to obtain the required rhombus ABCD.

Hence, the above figure is the required rhombus.

(iii) Given, adjacent sides of lengths are 5 cm and 4 cm.

In a rectangle, the opposite sides measure the same and each interior angle is equal to 90°.

(a) Draw a rough sketch which will help us to visualize the rectangle ABCD.

(b) Draw a line segment AB of 5 cm and an angle of 90° at A and B respectively.
(c) Cut arcs of 4 cm on the rays extending from A and B respectively and name the points of intersection as D and C respectively.

(d) Join DC.

Hence, the above figure is the required rectangle.

(iv) Given, OK = 5.5 cm and KA = 4.2 cm

Opposite sides of a parallelogram are equal and parallel to each other.

(a) Draw a rough sketch which will help us to visualize the parallelogram OKAY.

(b) Draw a line segment OK of 5.5 cm and any convenient angle at point A.
(c) Draw a ray from O such that it is parallel to the one at K. Cut arcs of 4.2 cm from O and K such that they intersect the rays at Y and A respectively.

Join AY to obtain the required parallelogram OKAY

Hence, the above figure is the required parallelogram.