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Chapter 4 Practical Geometry

Exercise 4.1 (Page 60 of Grade 8 NCERT)

Q1. 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

$$BE = 4.5 \text{ cm}$$

$$ET = 6 \text{ cm}$$

Difficulty Level: Easy

What is the known/given?

Measurements of a Quadrilateral

What is unknown?

Construction of a Quadrilateral

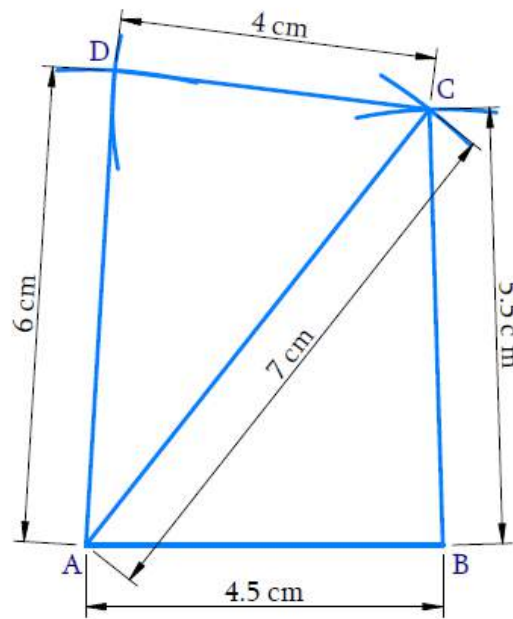
Reasoning:

As you are aware, we need five measurements to draw a quadrilateral (Page 58 of Grade 8 NCERT Book)

Based on the given information, the five given measurements are of 4 sides and one diagonal. When measurements of 4 sides and one diagonal of a quadrilateral is given, we can construct a quadrilateral (Page 58 of Grade 8 NCERT Book)

Solution:

Let us first draw a rough sketch of quadrilateral.



Construction of quadrilateral can be done in two parts. First construct triangle ABC and then triangle ACD. Let us find based on given measurements whether it is possible to construct the triangles.

In ABC, $5.5 + 4.5 > 7$ and $5.5 - 4.5 < 7$

$$7 + 4.5 > 5.5 \text{ and } 7 - 4.5 < 5.5$$

$$5.5 + 7 > 4.5 \text{ and } 7 - 5.5 < 4.5$$

It is possible to draw triangle ABC.

In ACD

$$7 + 4 > 6 \text{ and } 7 - 4 < 6$$

$$6 + 7 > 4 \text{ and } 7 - 6 < 4$$

$$6 + 4 > 7 \text{ and } 6 - 4 < 7$$

So, construction of triangle ACD is also possible.

Let us construct the quadrilateral.

Step 1: Draw line segment $AB = 4.5$ cm. With B as center and radius 5.5 cm draw an arc. With A as center and radius 7 cm draw another arc cutting the former arc. C is the intersecting point of arcs. Join BC and AC.

Step 2: Based on rough diagram, it is easy to find that AC is the diagonal. Therefore, the fourth vertex D should be on the opposite to B with reference to AC.

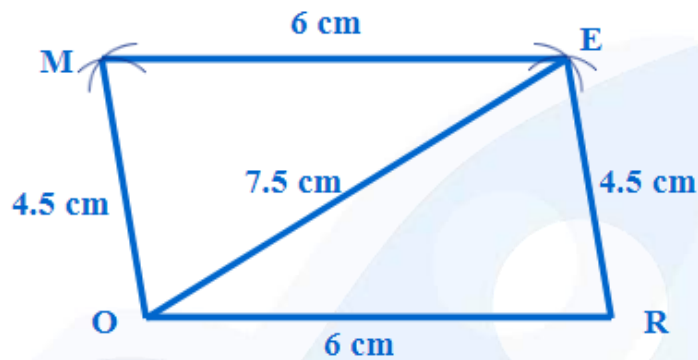
Step 3: With A as center and radius 6 cm draw an arc on the opposite side of point B. With C as center and radius 4 cm draw another arc cutting the former arc. D is the intersecting point of the arcs. Join AD and CD. ABCD is the required quadrilateral.

Related Problems.

Ex 4.1 (ii)

(iii) Parallelogram MORE

Using the concept opposite sides of parallelogram are parallel and equal, the five measurements can be found.

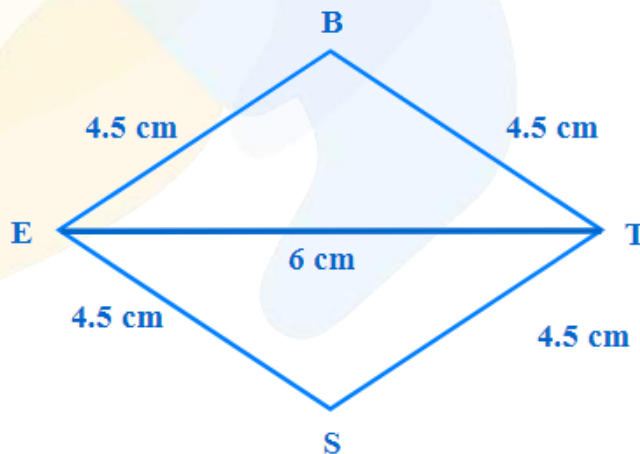


(iv) Rhombus BEST

BE = 4.5 cm

ET = 6 cm

All sides of a rhombus are equal and opposite sides are parallel, measurements of all sides can be found.



Chapter 4 Practical Geometry

Exercise 4.2 (Page 62 of Grade 8 NCERT)

Q1. Construct the following quadrilaterals.

(i) Quadrilateral LIFT

$$LI = 4 \text{ cm}$$

$$IF = 3 \text{ cm}$$

$$TL = 2.5 \text{ cm}$$

$$LF = 4.5 \text{ cm}$$

$$IT = 4 \text{ cm}$$

(ii) Quadrilateral GOLD

$$OL = 7.5 \text{ cm}$$

$$GL = 6 \text{ cm}$$

$$GD = 6 \text{ cm}$$

$$LD = 5 \text{ cm}$$

$$OD = 10 \text{ cm}$$

(iii) Rhombus BEND

$$BN = 5.6 \text{ cm}$$

$$DE = 6.5 \text{ cm}$$

Difficulty Level: Easy

What is the known/given?

Measurements of a Quadrilateral.

What is unknown?

Construction of a Quadrilateral

Reasoning:

As you are aware, we need five measurements to draw a quadrilateral (Page 58 of Grade 8 NCERT Book)

Solution:

Let us draw a rough diagram with the given measurements to find out whether it is possible to construct a quadrilateral

Based on the given information it is easy to find out that the five given measurements are of 3 sides and two diagonals. When measurements of 3 sides and two diagonals of a quadrilateral are given, we can construct a quadrilateral (Page 58 of Grade 8 NCERT Book) The construction can be done in two parts. First draw $\triangle LIF$ and then draw $\triangle LIT$ and then join the other side.

Let us see whether it is possible

In $\triangle LIF$, $4 + 3 > 4.5$ and $4 - 3 < 4.5$
 $4.5 + 3 > 4$ and $4.5 - 3 < 4$
 $4.5 + 4 > 3$ and $4.5 - 4 < 3$

In $\triangle LIT$, $4 + 4 > 2.5$ and $4 - 4 < 2.5$
 $4 + 2.5 > 4$ and $4 - 2.5 < 4$
 $4 + 2.5 > 4$ and $4 - 2.5 < 4$

In both cases, it is possible to form triangle.

Let us construct the quadrilateral

Step 1: Construct Line $LI=4$ cm. With L as center and 4.5 cm as radius draw an arc. With I as center and 3 cm as radius draw an arc cutting the former one. The intersection point is F . Join IF and LF .

Step 2: With L as center and radius 2.5 cm draw an arc. With I as center and 4 cm as radius draw an arc cutting the former one at T . Join LT and IT .

Step 3: Join FT .

Step 4: $LIFT$ is the required quadrilateral

Related Problems

(ii) Quadrilateral GOLD

$$OL = 7.5 \text{ cm}$$

$$GL = 6 \text{ cm}$$

$$GD = 6 \text{ cm}$$

$$LD = 5 \text{ cm}$$

$$OD = 10 \text{ cm}$$

(iii) Rhombus BEND

$$BN = 5.6 \text{ cm}$$

$$DE = 6.5 \text{ cm}$$

Chapter 4 Practical Geometry

Exercise 4.3 (Page 64 of Grade 8 NCERT)

Q1. Construct the following quadrilaterals.

(i) Quadrilateral MORE

$$MO = 6 \text{ cm}$$

$$OR = 4.5 \text{ cm}$$

$$\angle M = 60^\circ$$

$$\angle O = 105^\circ$$

$$\angle R = 105^\circ$$

(ii) Quadrilateral PLAN

$$PL = 4 \text{ cm}$$

$$LA = 6.5 \text{ cm}$$

$$\angle P = 90^\circ$$

$$\angle A = 110^\circ$$

$$\angle N = 85^\circ$$

(iii) Parallelogram HEAR

$$HE = 5 \text{ cm}$$

$$EA = 6 \text{ cm}$$

$$\angle R = 85^\circ$$

(iv) Rectangle OKAY

$$OK = 7 \text{ cm}$$

$$KA = 5 \text{ cm}$$

Difficulty Level: Advance

What is the known/given?

Measurements of two sides and three angles

What is unknown?

Construction of a Quadrilateral

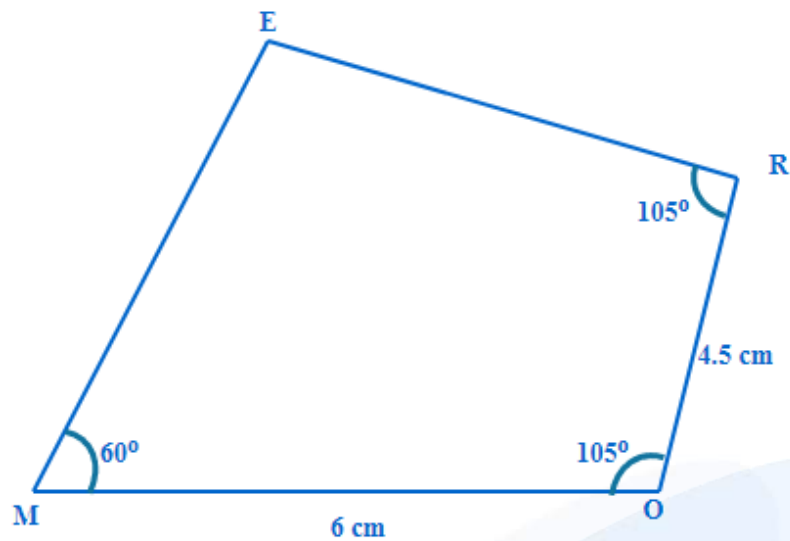
Reasoning:

As you are aware, we need five measurements to draw a quadrilateral (Page 58 of Grade 8 NCERT Book).

The measurements of two adjacent sides and three angles (Page 58 of Grade 8 NCERT Book)

Solution:

Let us draw a rough diagram of the quadrilateral



Let us construct the quadrilateral

Step 1: Draw a line segment $MO = 6$ cm.

Step 2: With M as center draw angle of measure 60° .

Step 3: Draw 105° from O.

Step 4: With O as center and radius 4.5 cm draw an arc cutting the ray from O at R.
 $OR = 4.5$ cm

Step 5: Construct an angle of 105° from R as above. The ray from R meets the ray from M at a point. Mark the intersection point as E.

Step 6: MORE is the required quadrilateral.

Chapter 4 Practical Geometry

Exercise 4.4 (Page 67 of Grade 8 NCERT)

Q1. Construct the following quadrilaterals.

- (i) Quadrilateral DEAR
DE = 4cm
EA = 5cm
AR = 4.5cm
 $\angle E = 60^\circ$
 $\angle A = 90^\circ$

- (ii) Quadrilateral TRUE
TR = 3.5cm
RU = 3cm
UE = 4cm
 $\angle R = 75^\circ$
 $\angle U = 120^\circ$

Difficulty Level: Advance

What is the known/given?

Measurements of a Quadrilateral (3 line segments and 2 angles).

What is unknown?

Construction of a Quadrilateral

Reasoning:

As you are aware, we need five measurements to draw a quadrilateral. The given measurements are of three sides and two included angles (Page 58 of Grade 8 NCERT Book)

Solution:

Let us draw a rough diagram with the given measurements to find out whether it is possible to construct a quadrilateral

Let us construct the quadrilateral

Step 1: Draw a line segment TR = 3.5 cm.

Step 2: With R as center construct an angle of 75° . With R as center and radius 3 cm draw an arc cutting the ray from R at U.

Step 3: With U as center construct an angle of 120° . With U as center and radius 4 cm draw an arc cutting the ray from U at E.

Step 4: Join TE.

Step 5: TRUE is the required quadrilateral.



Chapter 4 Practical Geometry

Exercise 4.5 (Page 68 of Grade 8 NCERT)

Draw the following.

1. A square READ with RE = 5.1 cm.
2. A rhombus whose diagonals are 5.2 cm and 6.4 cm long.
3. A rectangle with adjacent sides of lengths 5 cm and 4 cm.
4. A parallelogram OKAY where OK = 5.5 cm and KA = 4.2 cm. Is it unique?

Difficulty Level: Easy

What is the known/given?

Diagonals of a Rhombus.

What is unknown?

Construction of a Rhombus

Reasoning:

We need five measurements to draw a unique quadrilateral. (Page 58 of Grade 8 NCERT book).

But we also know that diagonals of rhombus bisect each other at right angles and all sides of rhombus are equal. We can use this information to construct the rhombus.

Solution:

Step 1: Draw a line segment AB=6.4 cm.

Step 2: Draw perpendicular bisector of AB meeting AB at O.

Step 3: 5.2 cm divided by 2 = 2.6 cm. Measure 2.6 cm from O on either side of AB on perpendicular bisector and mark them as C and D.

Step 4: Join AC, AD, BC and BD.

Step 5: ABCD is the required rhombus.

Related Problems:

- (1) The square READ with RE=5.1 cm.

Hint: All sides of square are equal, and angles are at right angles.

(2) A rectangle with adjacent sides of lengths 5 cm and 4 cm.

Hint: Opposite sides of rectangle are equal and parallel, and angles are at right angles.

(3) A parallelogram OKAY where $OK=5.5$ cm and $KA=4.2$ cm.

Hint: Opposite sides of a parallelogram are parallel and equal. Using this information, parallelogram can be constructed with a convenient angle.



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