PRACTICE SET 8.1 PAGE NO: 43

1. Construct the following quadrilaterals of given measures.

(1) In ▭ MORE, l(MO) = 5.8 cm, l(OR) = 4.4 cm, m∠M = 58°, m∠O = 105°, m∠R = 90°.

(2) Construct ▭ DEFG such that l(DE) = 4.5 cm, l(EF) = 6.5 cm, l(DG) = 5.5 cm, l(DF) = 7.2 cm, l(EG) = 7.8 cm.

(3) In ▭ ABCD, l(AB) = 6.4 cm, l(BC) = 4.8 cm, m∠A = 70°, m∠B = 50°, m∠C = 140°.

(4) Construct ▭ LMNO such that l(LM) = l(LO) = 6 cm, l(ON) = l(NM) = 4.5 cm, l(OM) = 7.5 cm.

Solution:

(1) In ▭ MORE, l(MO) = 5.8 cm, l(OR) = 4.4 cm, m∠M = 58°, m∠O = 105°, m∠R = 90°.

Steps to construct a quadrilateral:

Step 1: Draw a line MO = 5.8cm.

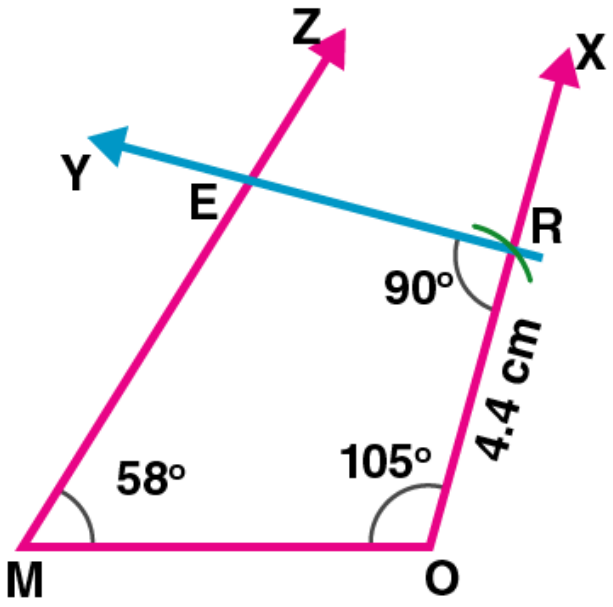
Step 2: At point O, construct an angle of 105^{o}. Such that it forms a line OX.

Step 3: At point M, construct an angle of 58^{o}. Such that it forms a line MZ.

Step 4: With O as the centre and of radius 4.4cm, cut an arc on the line OX and mark that point as R.

Step 5: Now, at point R construct an angle of 90^{o}. Such that it forms a line RY and the point E is formed intersecting on the line MZ.

Here, is the required MORE quadrilateral.



(2) Construct ▭ DEFG such that l(DE) = 4.5 cm, l(EF) = 6.5 cm, l(DG) = 5.5 cm, l(DF) = 7.2 cm, l(EG) = 7.8 cm.

Steps to construct a quadrilateral:

Step 1: Draw a line DE = 4.5cm.

Step 2: With D as the centre and radius 7.2cm, draw an arc.

Step 3: With E as the centre and radius 6.5cm, draw an arc cutting the previous arc at F.

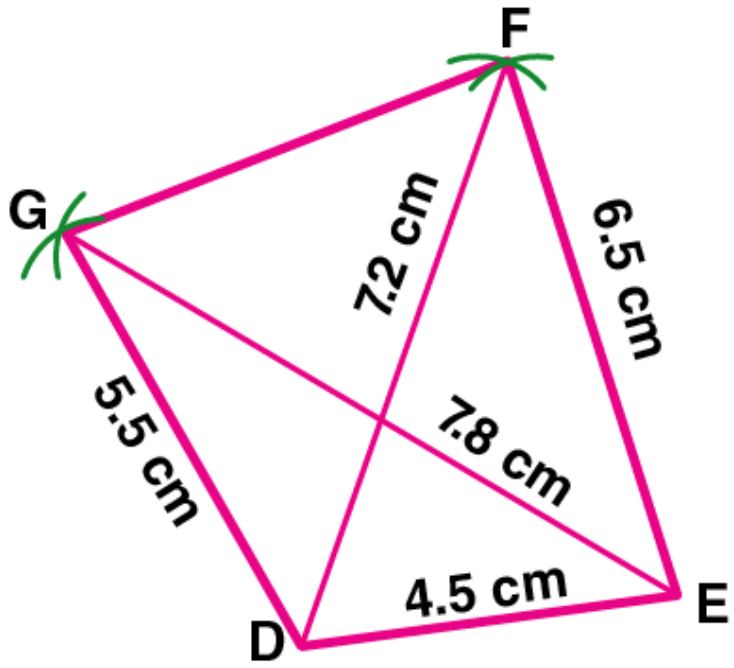
Step 4: Join EF and DF.

Step 5: With D as the centre and radius 5.5cm, draw an arc.

Step 6: With E as the centre and radius 7.8cm, draw an arc cutting the previous ac at G.

Step 7: Join DG, EG and GF.

Here, is the required DEFG quadrilateral.



(3) In $\square$ ABCD, l(AB) = 6.4 cm, l(BC) = 4.8 cm, m∠A = 70°, m∠B = 50°, m∠C = 140°.

Steps to construct a quadrilateral:

Step 1: Draw a line AB = 6.4cm.

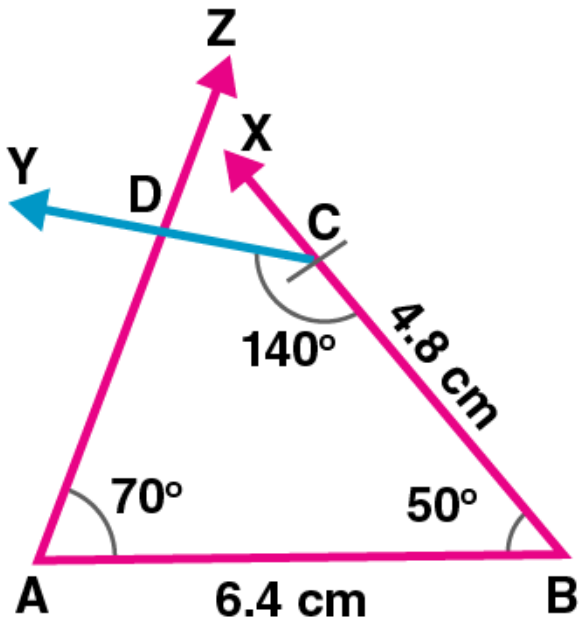
Step 2: construct an angle at point B of 50^o

Step 3: With B as the centre and radius of 4.8cm, draw an arc cutting the line BX at point C.

Step 4: construct an angle of 140^o at point C and name that line as Y.

Step 5: construct an angle of 70^o at point A, such that line AZ and line CY intersect at point D.

Here, is the required ABCD quadrilateral.



(4) Construct □ LMNO such that l(LM) = l(LO) = 6 cm, l(ON) = l(NM) = 4.5 cm, l(OM) = 7.5 cm.

Steps to construct a quadrilateral:

Step 1: Draw a line LM = 6cm.

Step 2: With L as the centre and radius 6cm, draw an arc.

Step 3: With M as the centre and radius 7.5cm, draw an arc cutting the previous arc at O.

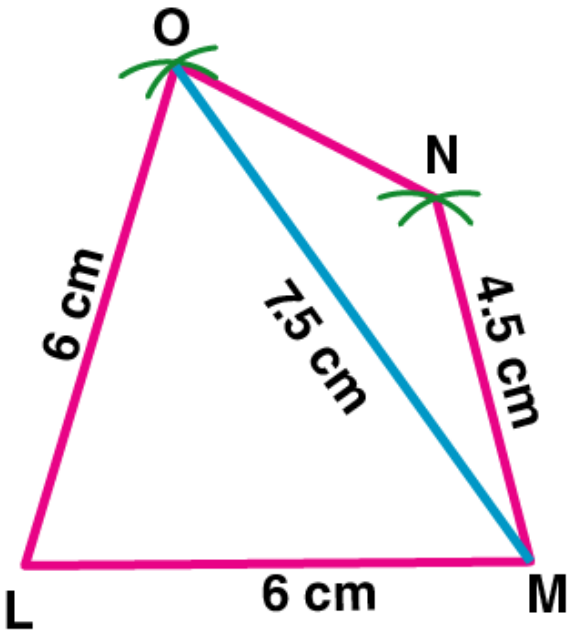
Step 4: Join OL and OL.

Step 5: With O as the centre and radius 4.5cm, draw an arc.

Step 6: With M as the centre and radius 4.5cm, draw an arc cutting the previous ac at N.

Step 7: Join ON, MN and OL.

Here, is the required LMNO quadrilateral.


O
N
6 cm
7.5 cm
4.5 cm
L
6 cm
M

PRACTICE SET 8.2 PAGE NO: 46

1. Draw a rectangle ABCD such that l(AB) = 6.0 cm and l(BC) = 4.5 cm.

Solution:

Steps to construct a rectangle:

Step 1: Draw a line AB = 6cm.

Step 2: Construct an angle of 90^o at point B.

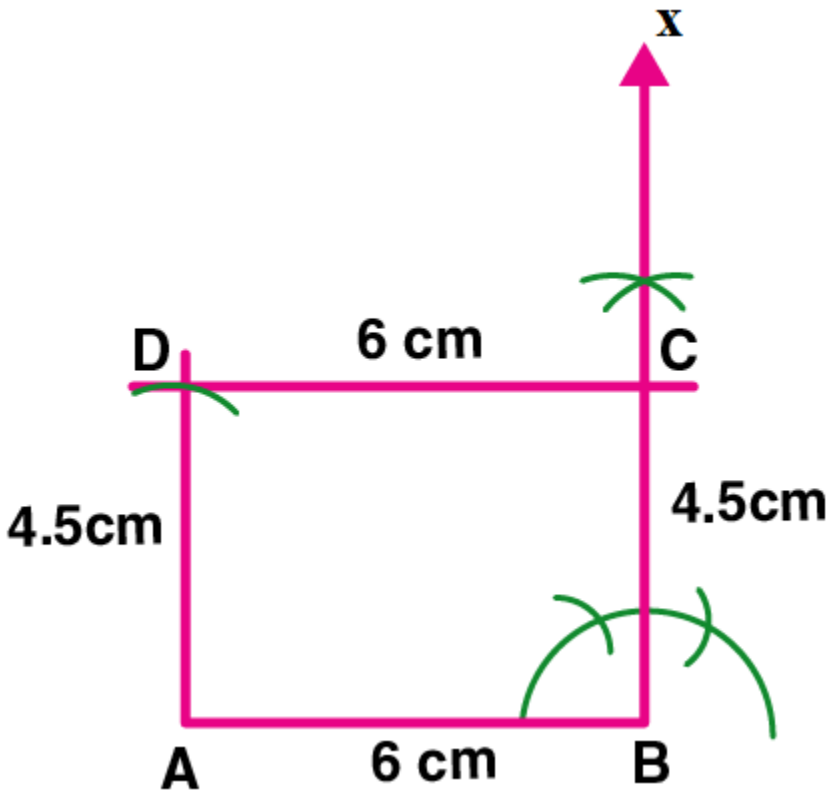
Step 3: With B as centre and radius 4.5cm, draw an arc cutting the line BX at point C.

Step 4: With C as centre and radius 6cm, draw an arc.

Step 5: With A as the centre and radius 4.5cm, draw an arc cutting the previous arc at point D.

Step 6: Join AD and CD.

Here, is the required ABCD rectangle.



2. Draw a square WXYZ with side 5.2 cm.

Solution:

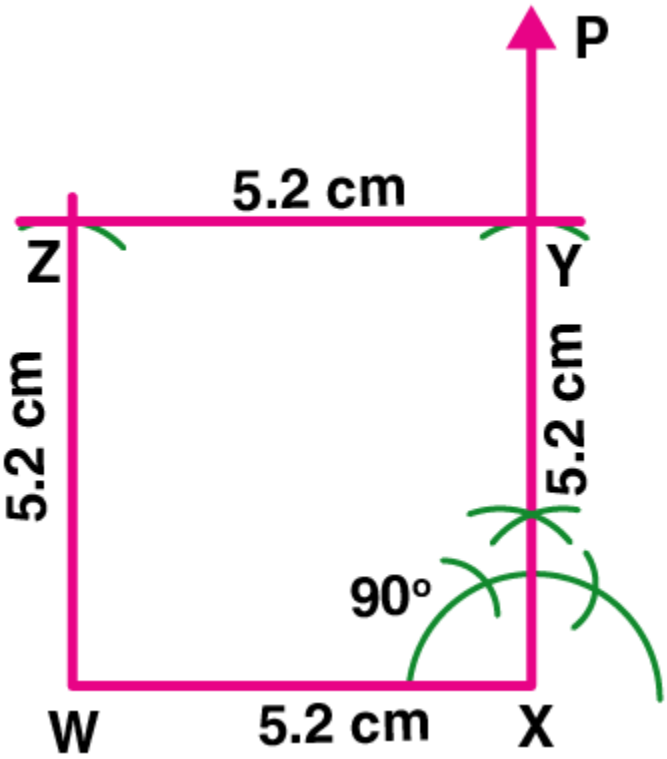
Steps to construct a square:

Step 1: Draw a line WX = 5.2cm.

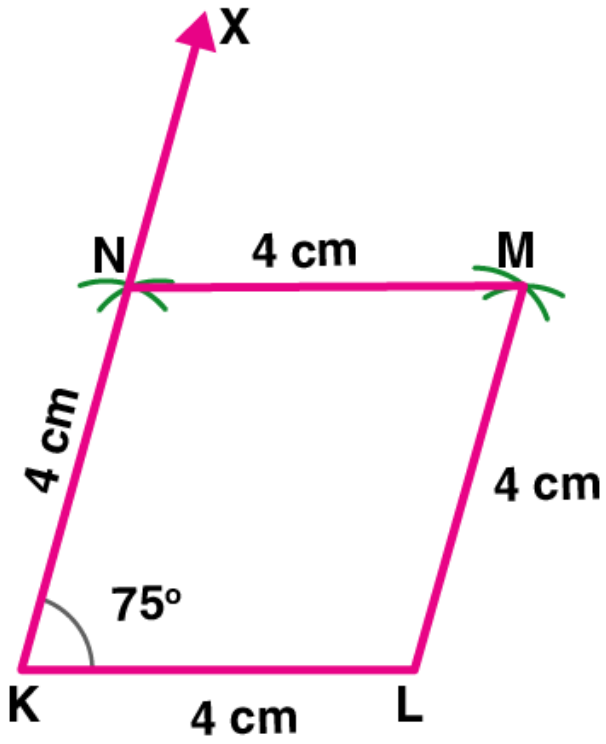
Step 2: Construct an angle of 90^o at point X.

Step 3: With X as centre and radius 5.2cm, draw an arc cutting the line XP at point Y.

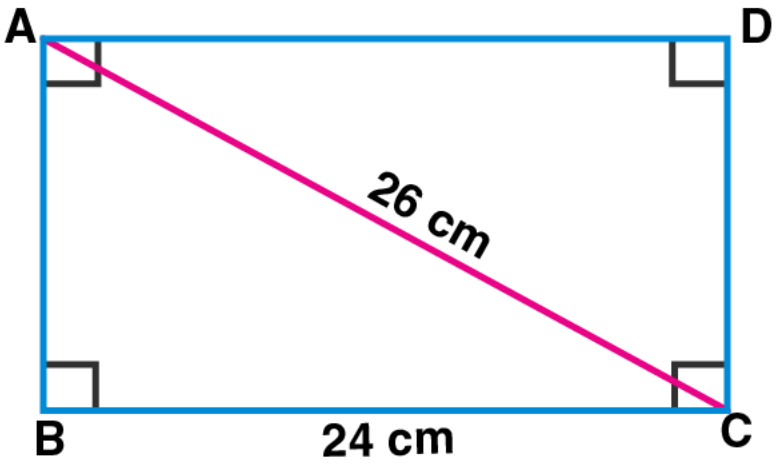
Step 4: With Y as centre and radius 5.2cm, draw an arc.
Step 5: With W as the centre and radius 5.2cm, draw an arc cutting the previous arc at point Z.
Step 6: Join YZ and WZ.
Here, is the required WXYZ square.



3. Draw a rhombus KLMN such that its side is 4 cm and m∠K = 75°.
Solution:
Steps to construct a rhombus:
Step 1: Draw a line KL = 4cm.
Step 2: Construct an angle of 75^{o} at point K.
Step 3: With K as centre and radius 4cm, draw an arc cutting the line KX at point N.
Step 4: With N as centre and radius 4cm, draw an arc.
Step 5: With L as the centre and radius 4cm, draw an arc cutting the previous arc at point M.
Step 6: Join LM and NM.
Here, is the required KLMN rhombus.



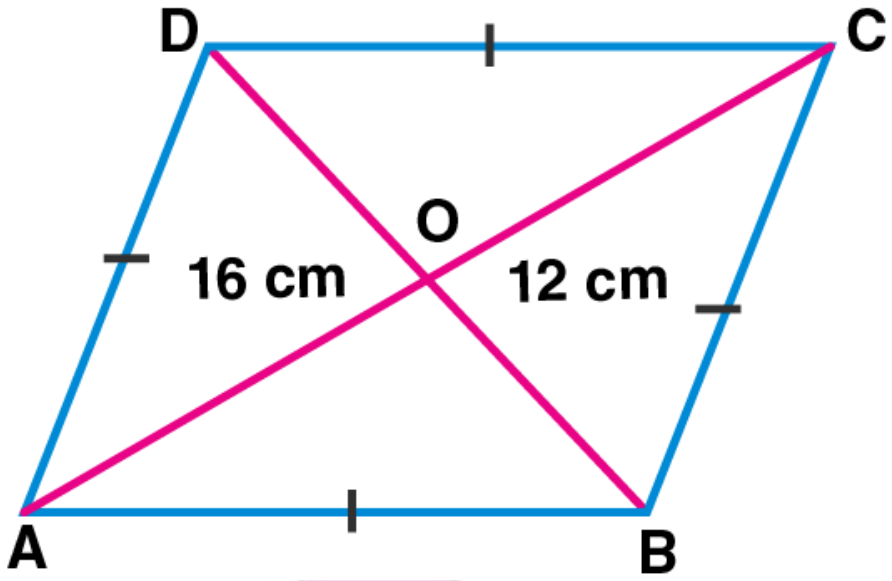
4. If diagonal of a rectangle is 26 cm and one side is 24 cm, find the other side.
Solution:



Let ABCD be the rectangle.
l(BC) = 24cm, l(AC) = 26cm
In ΔABC,
m∠ABC = 90° [Angle of a rectangle]
By using Pythagoras theorem,
$[l(AC)]^2 = [l(AB)]2 + [l(BC)]^2$

$(26)^2 = [l(AB)]^2 + (24)^2$
$(26)^2 – (24)^2 = [l(AB)]^2$
$(26 + 24)(26 – 24) = [l(AB)]^2$ [Since, $a^2 – b^2 = (a + b)(a – b)$]
$50 \times 2 = [l(AB)]^2$
$100 = [l(AB)]^2$
$l(AB) = \sqrt{100}$
By taking square root of both sides, we get
l(AB) =10 cm
∴The length of the other side is 10 cm.

5. Lengths of diagonals of a rhombus ABCD are 16 cm and 12 cm. Find the side and perimeter of the rhombus.
Solution:



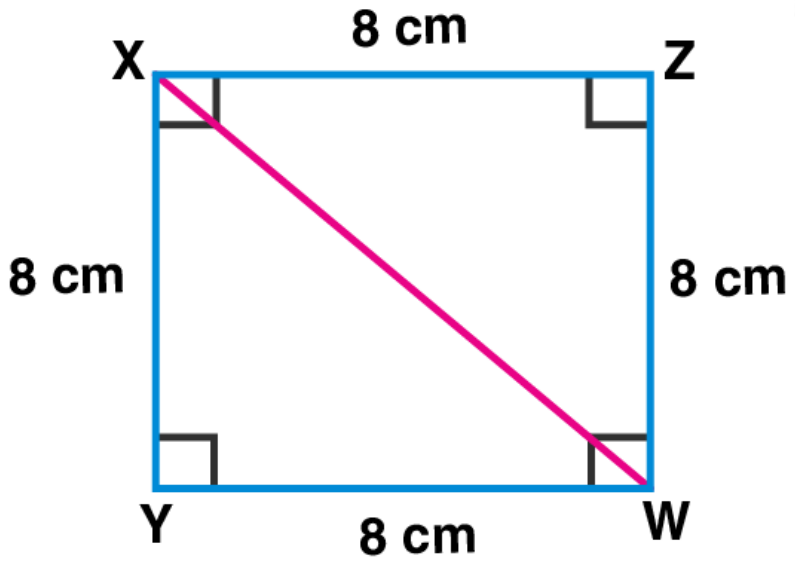
In rhombus ABCD,
It is given that, l(AC) = 16 cm and l(BD) = 12 cm.
Let the diagonals of rhombus ABCD intersect at point O.
l(AO) = 12 l(AC) [Diagonals of a rhombus bisect each other]
$l(AO) = 12 \times 16$
$= 8$ cm

Also, l(DO) = 12 l(BD) [Diagonals of a rhombus bisect each other]
$l(DO) = 12 \times 12$
l(DO) = 6 cm

In ΔDOA,
m∠DOA = 90° [Diagonals of a rhombus are perpendicular to each other]
By using Pythagoras theorem,
$[l(AD)]^2 = [l(AO)]^2 + [l(DO)]^2$
$= (8)^2 + (6)^2$
$= 64 + 36$
$[l(AD)]^2 = 100$
$l(AD) = \sqrt{100}$
By taking square root on both sides, we get
l(AD) = 10 cm
l(AB) = l(BC) = l(CD) = l(AD) = 10 cm [Since, sides of a rhombus are congruent]

Perimeter of rhombus ABCD
= l(AB) + l(BC) + l(CD) + l(AD)
= 10+10+10+10
= 40 cm
∴The side and perimeter of the rhombus are 10 cm and 40 cm respectively.

6. Find the length of diagonal of a square with side 8 cm.
Solution:

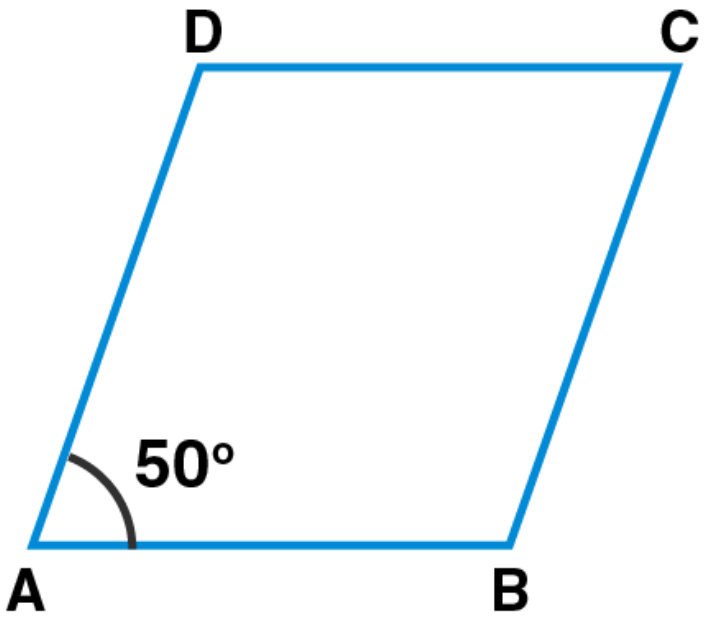


Let XYWZ be the square of side 8cm.
seg XW is a diagonal.

In Δ XYW,
m∠XYW = 90° [Angle of a square]
By using Pythagoras theorem,

$[l(XW)]^2 = [l(XY)]^2 + [l(YW)]^2$
$= (8)^2 + (8)^2$
$= 64 + 64$
$[l(XW)]^2 = 128$
By taking square root on both sides, we get
$l(XW) = \sqrt{128}$
$= \sqrt{64} \times 2$
$= 8\sqrt{2}$ cm
∴ The length of the diagonal of the square is $8\sqrt{2}$ cm.

7. Measure of one angle of a rhombus is 50°, find the measures of remaining three angles.
Solution:



Let ABCD be the rhombus.
$m\angle A = 50°$
$m\angle C = m\angle A$ [Since, opposite angles of a rhombus are congruent]
∴ $m\angle C = 50°$
Also, $m\angle D = m\angle B$ …(i) [Opposite angles of a rhombus are congruent]

In rhombus ABCD, we know that sum of the measures of the angles of a quadrilateral is 360°.
$m\angle A + m\angle B + m\angle C + m\angle D = 360°$
$50° + m\angle B + 50° + m\angle D = 360°$
$m\angle B + m\angle D + 100° = 360°$

$m\angle B + m\angle D = 360° – 100°$
$m\angle B + m\angle B = 260°$ [From (i)]
$2m\angle B = 260°$
$m\angle B = 260/2$
$m\angle B = 130°$
$m\angle D = m\angle B = 130°$ [From (i)]
∴ The measures of the remaining angles of the rhombus are 130°, 50° and 130°.

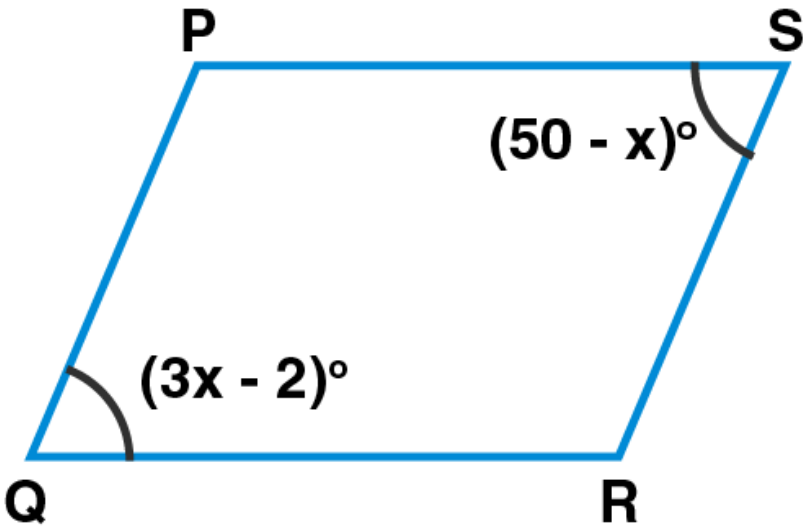
PRACTICE SET 8.3 PAGE NO: 49

1. Measures of opposite angles of a parallelogram are (3x – 2)° and (50 – x)°. Find the measure of its each angle.

Solution:

Let PQRS be the parallelogram.

m∠Q = (3x – 2)° and m∠S = (50 – x)°



m∠Q = m∠S …..(i) [Since, opposite angles of a parallelogram are congruent]

3x – 2 = 50 – x

3x + x = 50 + 2

4x = 52

x = 52/4

x = 13

Now, m∠Q = (3x – 2)°

(3 × 13 – 2)° = (39 – 2)° = 37°

m∠S = m∠Q = 37° [From(i)]

m∠P + m∠Q = 180° [Since, adjacent angles of a parallelogram are supplementary]

m∠P + 37° = 180°

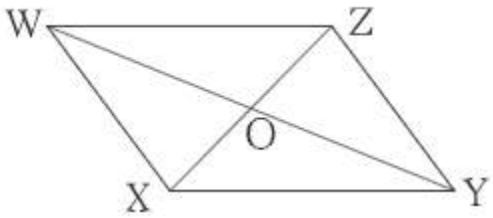
m∠P = 180° – 37° = 143°

m∠R = m∠P = 143° [Since, opposite angles of a parallelogram are congruent]

∴ The measures of the angles of the parallelogram are 37°, 143°, 37° and 143°.

2. Referring the given figure of a parallelogram, write the answers of questions given below.

(1) If l(WZ) = 4.5 cm, then l(XY) = ?
(2) If l(YZ) = 8.2 cm, then l(XW) = ?
(3) If l(OX) = 2.5 cm, then l(OZ) = ?
(4) If l(WO) = 3.3 cm, then l(WY) = ?
(5) If m∠WZY = 120°, then m∠WXY = ? and m∠XWZ = ?



Solution:

(1) It is given that, l(WZ) = 4.5 cm
l(X Y) = l(WZ) [Since, opposite sides of a parallelogram are congruent]
∴ l(X Y) = 4.5cm

(2) It is given that, l(YZ) = 8.2 cm
l(XW) = l(YZ) [Since, opposite sides of a parallelogram are congruent]
∴ l(XW) = 8.2cm

(3) It is given that, l(OX) = 2.5 cm
l(OZ) = l(OX) [Since, diagonals of a parallelogram bisect each other]
∴ l(OZ) = 2.5cm

(4) It is given that, l(WO) = 3.3 cm
l(WO) = 1/2 l(WY) [Since, diagonals of a parallelogram bisect each other]
3.3 = 1/2 l(WY)
3.3 × 2 = l(WY)
∴ l(WY) = 6.6cm

(5) It is given that, m∠WZY =120°
m∠WXY = m∠WZY [Since, opposite angles of a parallelogram are congruent]
So, m∠WXY = 120^{o}
Now,
m∠XWZ + m∠WXY = 180° [Since, adjacent angles of a parallelogram are supplementary]
m∠XWZ + 120° = 180°
m∠XWZ = 180°- 120°
∴ m∠XWZ = 60°

3. Construct a parallelogram ABCD such that l(BC) = 7 cm, m∠ABC = 40°, l(AB) = 3 cm.

Solution:

Steps to construct:

Step 1: Draw a line AB = 3cm.

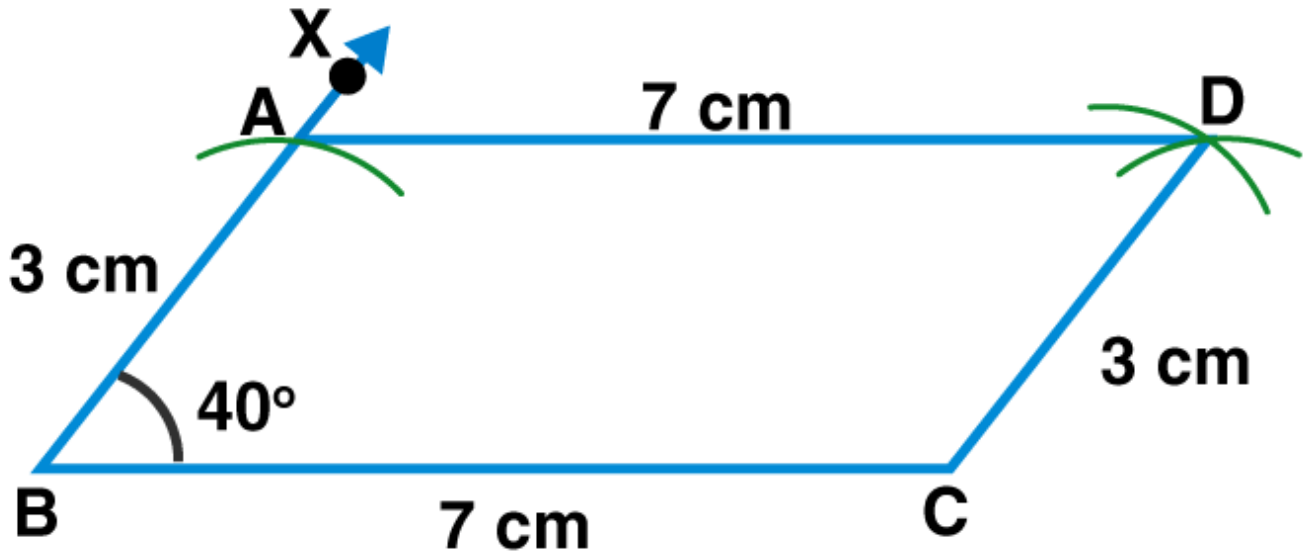
Step 2: Construct an angle of 40^{o} at point B.

Step 3: With B as centre and radius 7cm, draw an arc cutting the line BX at point C.

Step 4: With C as centre and radius 3cm, draw an arc.

Step 5: With A as the centre and radius 7cm, draw an arc cutting the previous arc at point D.

Step 6: Join AD and CD.



Opposite sides of a parallelogram are congruent.

∴ l(AB) = l(CD) = 3cm

l(BC) = l(AD) = 7 cm

4. Ratio of consecutive angles of a quadrilateral is 1: 2: 3: 4. Find the measure of its each angle. Write with reason, what type of a quadrilateral it is.

Solution:

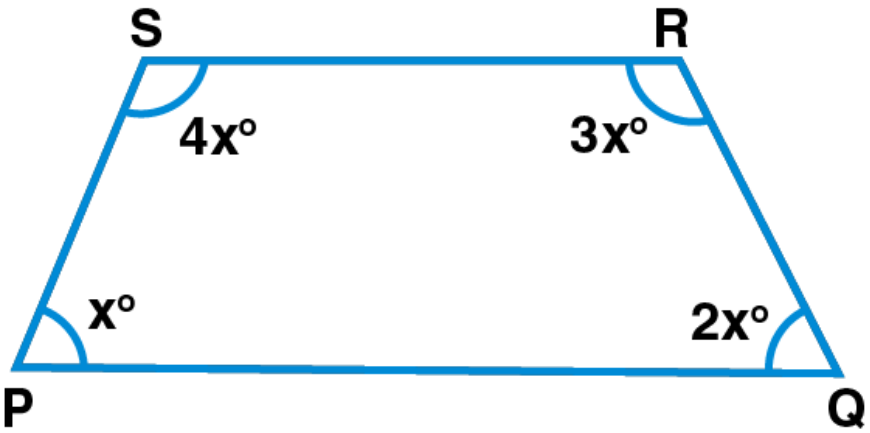
Let PQRS be the quadrilateral.

Ratio of consecutive angles of a quadrilateral is 1: 2: 3: 4.

Let us consider ‘x’ be the common multiple.

∴m∠P = x°, m∠Q = 2x°, m∠R = 3x° and m∠S = 4x°

In quadrilateral PQRS,
m∠P + m∠Q + m∠R + m∠S = 360° [Sum of the measures of the angles of a quadrilateral is 360°]
x° + 2x° + 3x° + 4x° = 360°
10 x° = 360°
x° = 360/10
x° = 36°
∴m∠P = x° = 36°

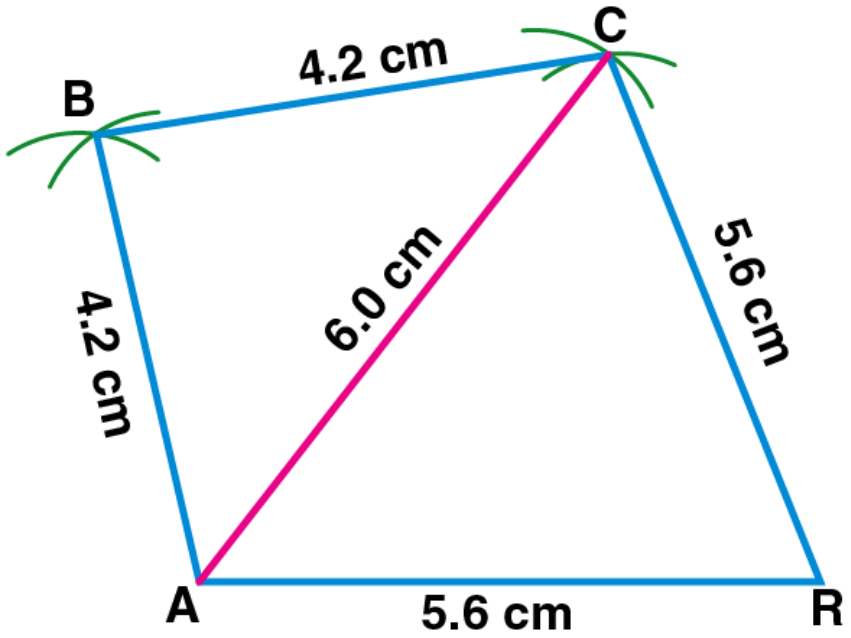


m∠Q = 2x° = 2 × 36° = 72°
m∠R = 3x° = 3 × 36° = 108° and
m∠S = 4x° = 4 × 36° = 144°
∴The measures of the angles of the quadrilateral are 36°, 72°, 108°, 144°.

Here, m∠P + m∠S = 36° + 144° = 180°
side PQ || side SR [Since, interior angles are supplementary]
m∠P + m∠Q = 36° + 72°
= 108°
≠ 180°
So, side PS is not parallel to side QR.
Since, one pair of opposite sides of the given quadrilateral is parallel.
∴The given quadrilateral is a trapezium.

5. Construct □ BARC such that l(BA) = l(BC) = 4.2 cm, l(AC) = 6.0 cm, l(AR) = l(CR) = 5.6 cm.
Solution:
Steps to construct:
Step 1: Draw a line BA = 4.2cm.

Step 2: With B as the centre and radius 4.2cm, draw an arc.
Step 3: With A as the centre and radius 6cm, draw an arc cutting the previous arc at C.
Step 4: Join BC and AC.
Step 5: With A as the centre and radius 5.6cm, draw an arc.
Step 6: With C as the centre and radius 5.6cm, draw an arc cutting the previous ac at D.
Step 7: Join AD, CD and BC.

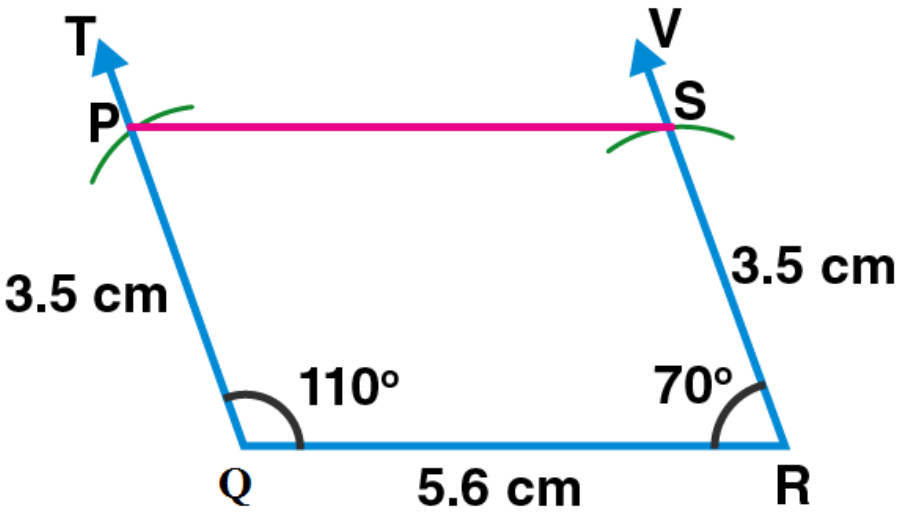


6. Construct □ PQRS, such that l(PQ) = 3.5 cm, l(QR) = 5.6 cm, l(RS) = 3.5 cm, m∠Q = 110°, m∠R = 70°.

If it is given that □ PQRS is a parallelogram, which of the given information is unnecessary?

Solution:

Steps to construct:
Step 1: Draw a line PQ = 3.5cm.
Step 2: Construct an angle of 110^{o} at point Q.
Step 3: With Q as centre and radius 5.6cm, draw an arc cutting the line QX at point R.
Step 4: Construct an angle of 70^{o} at point R.
Step 5: With R as the centre and radius 3.5cm, draw an arc cutting the Line RY at point S.
Step 6: Join RS and PS.



- Since, the opposite sides of a parallelogram are congruent.
  Either l(PQ) or l(SR) is required.
- To construct a parallelogram, length of adjacent sides and measure of one angle is required.
  Either l(PQ) and m∠Q or l(SR) and m∠R is the unnecessary information given in the question.