NCERT Solutions for Class 8 Maths Chapter 3 Understanding Quadrilaterals Ex 3.3

Ex 3.3 Class 8 Maths Question 1.

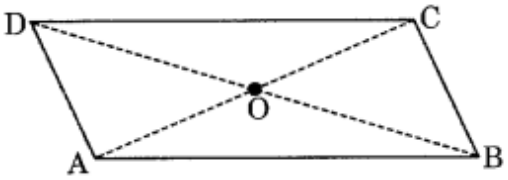
Given a parallelogram ABCD. Complete each statement along with the definition or property used.

(i) AD = ……

(ii) ∠DCB = ……

(iii) OC = ……

(iv) m∠DAB + m∠CDA = ……..



Solution:

(i) AD = BC [Opposite sides of a parallelogram are equal]

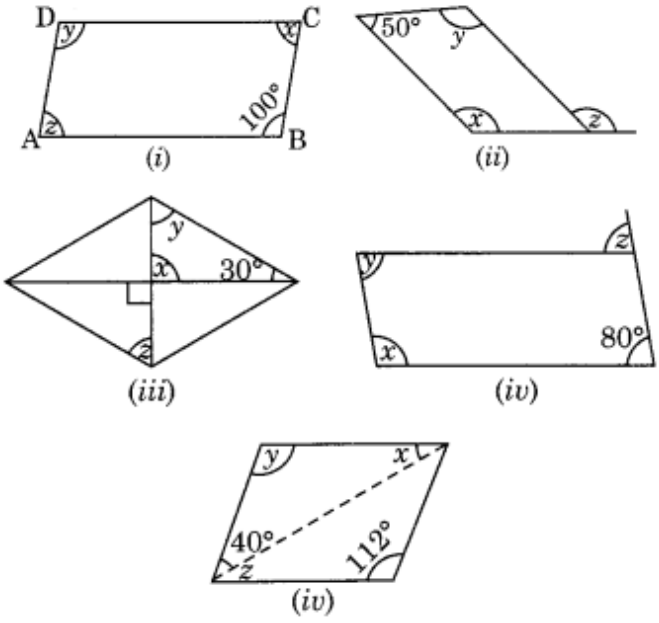
(ii) ∠DCB = ∠DAB [Opposite angles of a parallelogram are equal]

(iii) OC = OA [Diagonals of a parallelogram bisect each other]

(iv) m∠DAB + m∠CDA = 180° [Adjacent angles of a parallelogram are supplementary]

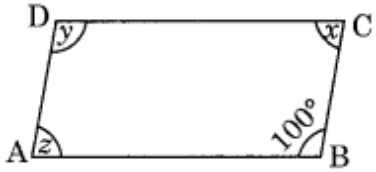
Ex 3.3 Class 8 Maths Question 2.

Consider the following parallelograms. Find the values of the unknowns x, y, z.



Solution:

(i) ABCD is a parallelogram.



∠B = ∠D [Opposite angles of a parallelogram are equal]

∠D = 100°

⇒ y = 100°

∠A + ∠B = 180° [Adjacent angles of a parallelogram are supplementary]

⇒ z + 100° = 180°

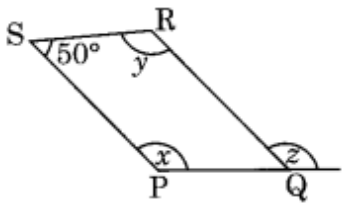
⇒ z = 180° – 100° = 80°

∠A = ∠C [Opposite angles of a ||gm]

x = 80°

Hence x = 80°, y = 100° and z = 80°

(ii) PQRS is a parallelogram.



∠P + ∠S = 180° [Adjacent angles of parallelogram]

⇒ x + 50° = 180°

x = 180° – 50° = 130°

Now, ∠P = ∠R [Opposite angles are equal]

⇒ x = y

⇒ y = 130°

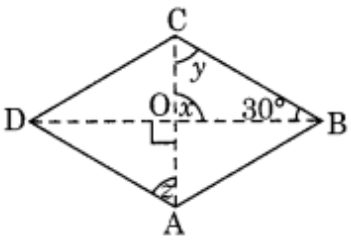
Also, y = z [Alternate angles]

z = 130°

Hence, x = 130°, y = 130° and z = 130°

(iii) ABCD is a rhombus.

[∵ Diagonals intersect at 90°]



x = 90°

Now in ΔOCB,

x + y + 30° = 180° (Angle sum property)

⇒ 90° + y + 30° = 180°

⇒ y + 120° = 180°

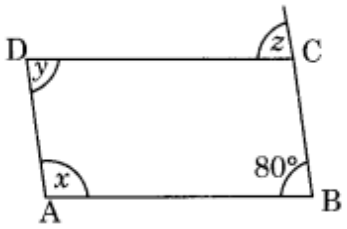
⇒ y = 180° – 120° = 60°

y = z (Alternate angles)

⇒ z = 60°

Hence, x = 90°, y = 60° and z = 60°.

(iv) ABCD is a parallelogram



∠A + ∠B = 180° (Adjacent angles of a parallelogram are supplementary)

⇒ x + 80° = 180°

⇒ x = 180° – 80° = 100°

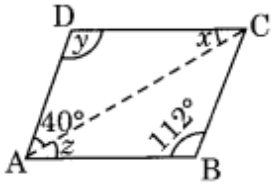
Now, ∠D = ∠B [Opposite angles of a |jgm]

⇒ y = 80°

Also, z = ∠B = 80° (Alternate angles)

Hence x = 100°, y = 80° and z = 80°

(v) ABCD is a parallelogram.



∠D = ∠B [Opposite angles of a ||gm]

y = 112°

x + y + 40° = 180° [Angle sum property]

⇒ x + 112° + 40° = 180°

⇒ x + 152° = 180°

⇒ x = 180° – 152 = 28°

z = x = 28° (Alternate angles)

Hence x = 28°, y = 112°, z = 28°.

Ex 3.3 Class 8 Maths Question 3.

Can a quadrilateral ABCD be a parallelogram if

(i) $\angle D + \angle B = 180°$?

(ii) AB = DC = 8 cm, AD = 4 cm and BC = 4.4 cm?

(iii) $\angle A = 70°$ and $\angle C = 65°$?

Solution:

(i) For $\angle D + \angle B = 180$, quadrilateral ABCD may be a parallelogram if following conditions are also fulfilled.

(a) The sum of measures of adjacent angles should be 180°.

(b) Opposite angles should also be of same measures. So, ABCD can be but need not be a parallelogram.

(ii) Given: AB = DC = 8 cm, AD = 4 cm, BC = 4.4 cm

In a parallelogram, opposite sides are equal.

Here $AD \neq BC$

Thus, ABCD cannot be a parallelogram.

(iii) $\angle A = 70°$ and $\angle C = 65°$

Since $\angle A \neq \angle C$

Opposite angles of quadrilateral are not equal.

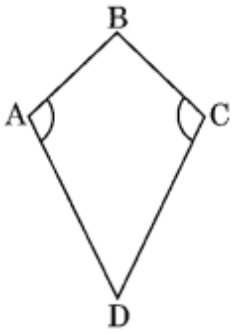
Hence, ABCD is not a parallelogram.

Ex 3.3 Class 8 Maths Question 4.

Draw a rough figure of a quadrilateral that is not a parallelogram but has exactly two opposite angles of equal measure.

Solution:

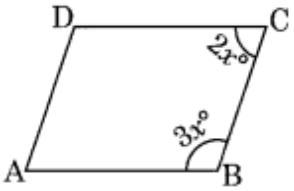
ABCD is a rough figure of a quadrilateral in which $m\angle A = m\angle C$ but it is not a parallelogram. It is a kite.



Ex 3.3 Class 8 Maths Question 5.

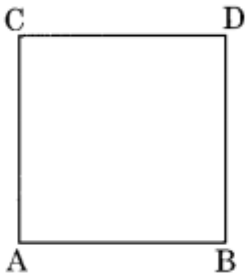
The measures of two adjacent angles of a parallelogram are in the ratio 3 : 2. Find the measure of each of the angles of the parallelogram.

Solution:
Let ABCD is parallelogram such that
m∠B : m∠C = 3 : 2



Let m∠B = 3x° and m∠C = 2x°
m∠B + m∠C = 180° (Sum of adjacent angles = 180°)
3x + 2x = 180°
⇒ 5x = 180°
⇒ x = 36°
Thus, ∠B = 3 × 36 = 108°
∠C = 2 × 36° = 72°
∠B = ∠D = 108°
and ∠A = ∠C = 72°
Hence, the measures of the angles of the parallelogram are 108°, 72°, 108° and 72°.

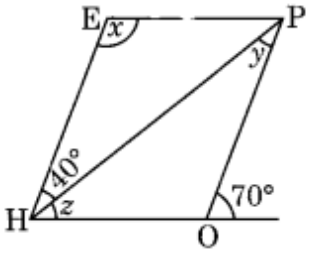
Ex 3.3 Class 8 Maths Question 6.
Two adjacent angles of a parallelogram have equal measure. Find the measure of each of the angles of the parallelogram.
Solution:
Let ABCD be a parallelogram in which
∠A = ∠B



We know ∠A + ∠B = 180° [Sum of adjacent angles = 180°]
∠A + ∠A = 180°
⇒ 2∠A = 180°
⇒ ∠A = 90°
Thus, ∠A = ∠C = 90° and ∠B = ∠D = 90°
[Opposite angles of a parallelogram are equal]

Ex 3.3 Class 8 Maths Question 7.

The adjacent figure HOPE is a parallelogram. Find the angle measures x, y and z. State the properties you use to find them.



Solution:

∠y = 40° (Alternate angles)

∠z + 40° = 70° (Exterior angle property)

⇒ ∠z = 70° – 40° = 30°

z = ∠EPH (Alternate angle)

In ΔEPH

∠x + 40° + ∠z = 180° (Adjacent angles)

⇒ ∠x + 40° + 30° = 180°

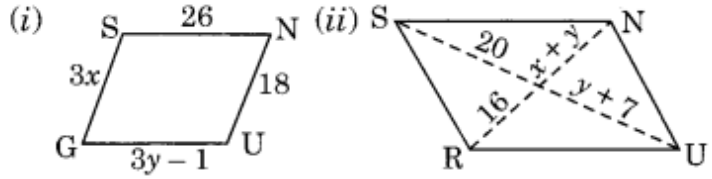
⇒ ∠x + 70° = 180°

⇒ ∠x = 180° – 70° = 110°

Hence x = 110°, y = 40° and z = 30°.

Ex 3.3 Class 8 Maths Question 8.

The following figures GUNS and RUNS are parallelograms. Find x and y. (Lengths are in cm)



Solution:

(i) GU = SN (Opposite sides of a parallelogram)

$$3y - 1 = 26$$

$$\Rightarrow \quad 3y = 26 + 1$$

$$\Rightarrow \quad 3y = 27$$

$$\therefore \quad y = \frac{\cancel{27}^{9}}{\cancel{3}} = 9$$

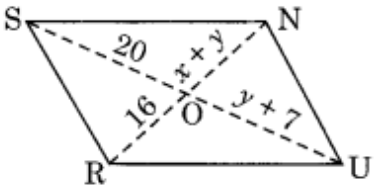
Similarly, GS = UN

$$3x = 18$$

$$\therefore \quad x = \frac{\cancel{18}^{6}}{\cancel{3}} = 6$$

Hence, $x = 6$ cm and $y = 9$ cm

(*ii*) Since, the diagonals of a parallelogram bisect each other



$\therefore$ OU = OS

$\Rightarrow$ y + 7 = 20

$\Rightarrow$ y = 20 – 7 = 13

Also, ON = OR

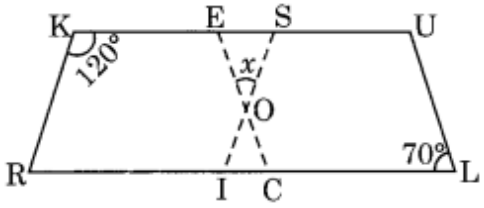
$\Rightarrow$ x + y = 16

$\Rightarrow$ x + 13 = 16

x = 16 – 13 = 3

Hence, x = 3 cm and y = 13 cm.

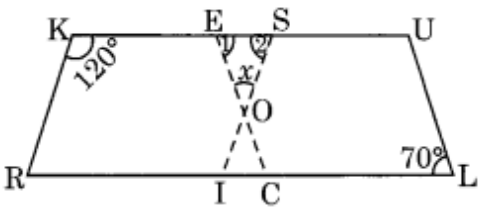
Ex 3.3 Class 8 Maths Question 9.



In the above figure both RISK and CLUE are parallelograms. Find the value of x.

Solution:

Here RISK and CLUE are two parallelograms.



∠1 = ∠L = 70° (Opposite angles of a parallelogram)

∠K + ∠2 = 180°

Sum of adjacent angles is 180°

120° + ∠2 = 180°

∠2 = 180° – 120° = 60°

In ΔOES,

∠x + ∠1 + ∠2 = 180° (Angle sum property)

⇒ ∠x + 70° + 60° = 180°

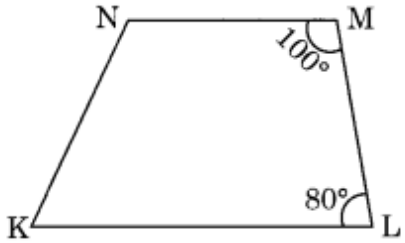
⇒ ∠x + 130° = 180°

⇒ ∠x = 180° – 130° = 50°

Hence x = 50°

Ex 3.3 Class 8 Maths Question 10.

Explain how this figure is a trapezium. Which of its two sides are parallel?



Solution:

∠M + ∠L = 100° + 80° = 180°

∠M and ∠L are the adjacent angles, and sum of adjacent interior angles is 180°

KL is parallel to NM

Hence KLMN is a trapezium.

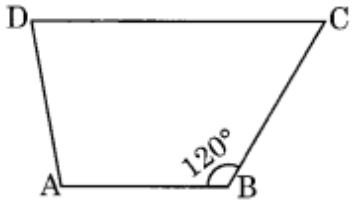
Ex 3.3 Class 8 Maths Question 11.

Find m∠C in below figure if $\bar{AB} \parallel \bar{DC}$

Solution:

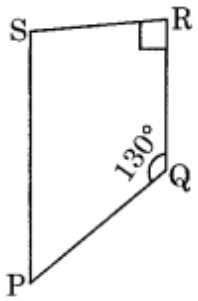
Given that $\bar{AB} \parallel \bar{DC}$

m∠B + m∠C = 180° (Sum of adjacent angles of a parallelogram is 180°)



120° + m∠C = 180°
m∠C = 180° – 120° = 60°
Hence m∠C = 60°

Ex 3.3 Class 8 Maths Question 12.
Find the measure of ∠P and ∠S if $\bar{SP} \parallel \bar{RQ}$ in figure, is there any other method to find m∠P?)



Solution:
Given that ∠Q = 130° and ∠R = 90°
$\bar{SP} \parallel \bar{RQ}$ (given)
∠P + ∠Q = 180° (Adjacent angles)
⇒ ∠P + 130° = 180°
⇒ ∠P = 180° – 130° = 50°
and, ∠S + ∠R = 180° (Adjacent angles)
⇒ ∠S + 90° = 180°
⇒ ∠S = 180° – 90° = 90°
Alternate Method:
∠Q = 130°, ∠R = 90° and ∠S = 90°
We know that
∠P + ∠Q + ∠R + ∠Q = 360° (Angle sum property of quadrilateral)
⇒ ∠P + 130° + 90° + 90° = 360°
⇒ ∠P + 310° = 360°
⇒ ∠P = 360° – 310° = 50°
Hence m∠P = 50°