



SpeedLabs

MATHS

CBSE 8th

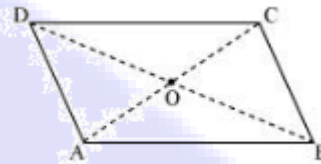
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Exercise-3.3

Q.1 Given a parallelogram ABCD. Complete each statement along with the definition or property used.

(i) $AD = \dots$ (ii) $\angle DCB = \dots$

(iii) $OC = \dots$ (iv) $m\angle DAB + m\angle CDA = \dots$



Sol:

(i) $AD = BC$ (Since, opposite sides of a parallelogram are equal)

(ii) $\angle DCB = \angle DAB$ (Opposite angles are equal in II gm)

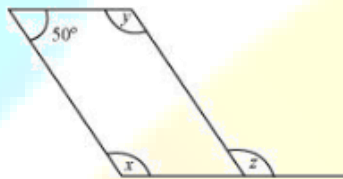
(iii) $OC = OA$ (Since diagonals of a parallelogram bisect each other)

(iv) $m\angle DAB + m\angle CDA = 180^\circ$ (\because The adjacent angles in a parallelogram are supplementary)

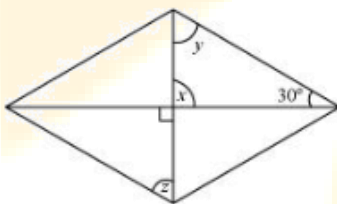
Q.2 Consider the following parallelograms. Find the values of the unknowns x , y , z .



(i)



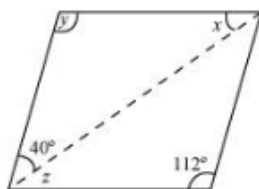
(ii)



(iii)



(iv)



(v)

Note. For getting correct answer, read $3^\circ = 30^\circ$ in (Fig. (iii))

Sol:

(i) $\angle B + \angle C = 180^\circ$ (The adjacent angles in a parallelogram are supplementary.)

$$\Rightarrow 100^\circ + x = 180^\circ$$

$$\Rightarrow x = 180^\circ - 100^\circ$$

$$\Rightarrow x = 80^\circ,$$

$$z = x = 80^\circ \text{ (opposite angle of 1/ gm)}$$

$$y = 100^\circ \text{ (opposite angle of 1/ gm are equal)}$$



(ii) $x + 50^\circ = 180^\circ$ (The adjacent angles in a parallelogram are supplementary.)

$$\Rightarrow x = 180^\circ - 50^\circ$$

$$\Rightarrow x = 130^\circ$$

$$\Rightarrow z = x = 130^\circ$$

(Corresponding angles)

$$\Rightarrow y = z = 130^\circ$$

(Alternate angles)

$$\Rightarrow x = y = 130^\circ$$

(Opposite angles of a parallelogram are equal)



(iii) $x = 90^\circ$

(Vertically opposite angles)

$$\Rightarrow y + x + 30^\circ = 180^\circ$$

(Angle sum property of a triangle)

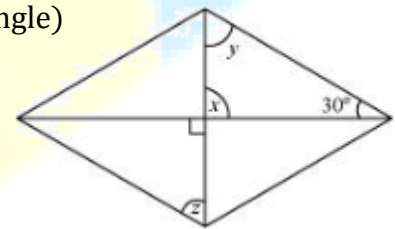
$$\Rightarrow y + 90^\circ + 30^\circ = 180^\circ$$

$$y + 120^\circ = 180^\circ$$

$$y = 180^\circ - 120^\circ = 60^\circ$$

$$z = y = 60^\circ$$

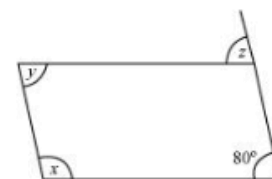
(Alternate angles)



(iv)

$$\Rightarrow z = 80^\circ \text{ (Corresponding angles)}$$

$$\Rightarrow x + 80^\circ = 180^\circ \text{ (The adjacent angles in a parallelogram are supplementary.)}$$



$$\Rightarrow x = 180^\circ - 80^\circ = 100^\circ$$

$$y = 80^\circ \quad (\text{Opposite angles are equal in 1/gm.})$$

$$(v) y = 112^\circ \quad (\text{Opposite angles of parallelogram are equal.})$$

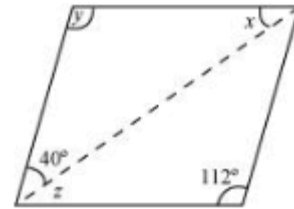
$$\Rightarrow 40^\circ + y + x = 180^\circ \quad (\text{Angle-sum property of a triangle.})$$

$$\Rightarrow 40^\circ + 112^\circ + x = 180^\circ$$

$$\Rightarrow 152^\circ + x = 180^\circ$$

$$\Rightarrow x = 180^\circ - 152^\circ \Rightarrow x = 28^\circ$$

$$\Rightarrow z = x = 28^\circ \quad (\text{Alternate angles}).$$



Q.3 Can a quadrilateral ABCD be a parallelogram, if

(i) $\angle D + \angle B = 180^\circ$?

(ii) $AB = DC = 8 \text{ cm}$, $AD = 4 \text{ cm}$ and $BC = 4.4 \text{ cm}$?

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

Sol:

(i) $\angle D + \angle B = 180^\circ$. It can be, but here, it needs not to be?

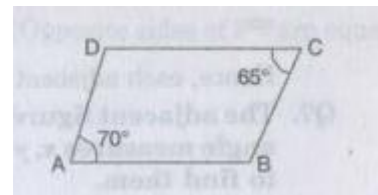
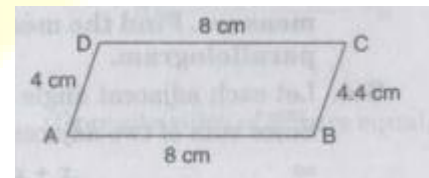
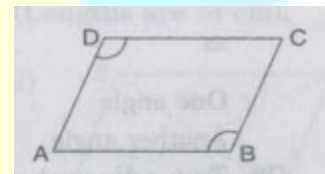
(ii) No. In this case. One pair of opposite sides are equal and another pair of opposite sides are unequal.

So, it is not a parallelogram.

(iii) No; $\angle A \neq \angle C$ (Since opposite angles are equal in II gm)

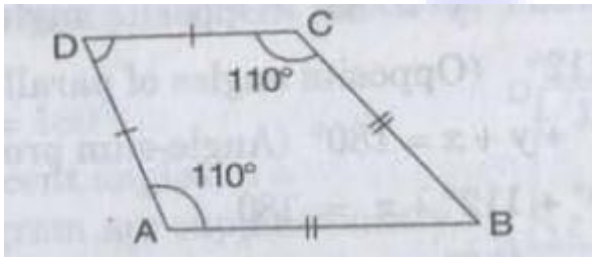
Here opposite angles are not equal in quadrilateral ABCD.

So, it is not a parallelogram.



Q.4 Draw a rough figure of a quadrilateral that is not a parallelogram but has exactly two opposite angles equal measure.

Sol: ABCD is a quadrilateral in which opposite angles $\angle A = \angle C = 110^\circ$



So, it is a kite.

Q.5 The measure of two adjacent angles of a parallelogram are in the ratio 3 : 2. Find the measure of each of the angles of the parallelogram.

Sol: Let two adjacent angles be $3x$ and $2x$.

Since the adjacent angles in a parallelogram are supplementary.

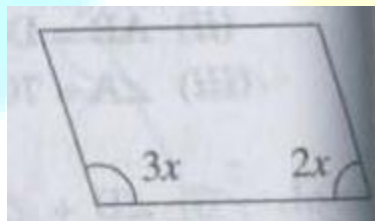
$$\Rightarrow 3x + 2x = 180^\circ$$

$$\Rightarrow 5x = 180^\circ$$

$$\Rightarrow x = \frac{180^\circ}{5} = 36^\circ$$

$$\text{One angle} = 3 \times 36^\circ = 108^\circ$$

$$\text{Another angle} = 2 \times 36^\circ = 72^\circ$$



Q.6 Two adjacent angles of a parallelogram have equal measure. Find the measure of each of the angles of the parallelogram.

Sol: Let each adjacent angle be x .

Since sum of two adjacent angles in II gm are supplementary

$$\Rightarrow x + x = 180^\circ$$

$$\Rightarrow 2x = 180^\circ \Rightarrow x = \frac{180^\circ}{2} = 90^\circ$$

Hence, each adjacent angle is 90° .

Q.7 The adjacent figure HOPE is a parallelogram. Find the angle measures x , y and z . State the properties you use to find them. $\angle HOP + 70^\circ = 180^\circ$

Sol: $\angle HOP = 180^\circ - 70^\circ = 110^\circ$. (Angles of linear pair)

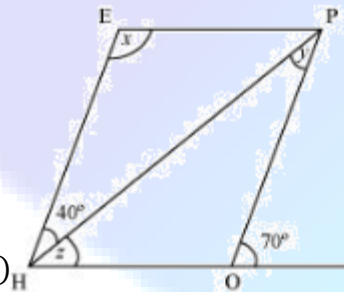
$\angle E = \angle HOP$ (Opposite angles of a parallelogram are equal)

$$x = 110^\circ$$

$\angle PHE = \angle HPO$ (Alternate angles)

$$\therefore y = 40^\circ$$

$\therefore \angle EHO = \angle a = 70^\circ$ (Corresponding angle)

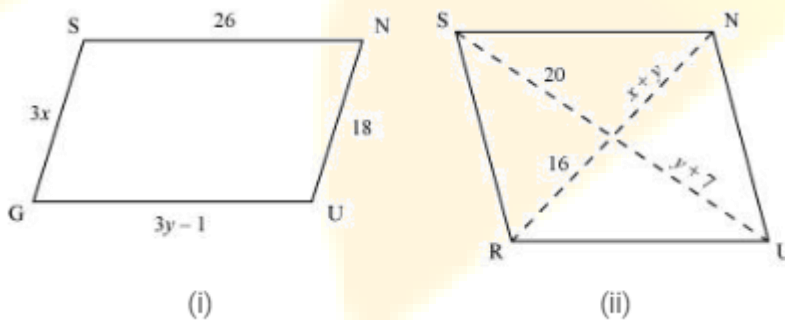


$$40^\circ + z = 70^\circ$$

$$\Rightarrow z = 70^\circ - 40^\circ$$

\Rightarrow Hence, $z = 30^\circ$, $x = 110^\circ$, $y = 40^\circ$, $Z = 30^\circ$.

Q.8: The following figures GUNS and RUNS are parallelogram. Find x and y . (Lengths are in cm)



Sol: (i) In II gm GUNS (Opposite sides of ll gm are equal)

$$GS = UN$$

$$3x = 18$$

$$\Rightarrow x = \frac{18}{3} = 6\text{cm}$$

and $GU = SN$ (Opposite sides of ll gm are equal)

$$\Rightarrow 3y - 1 = 26$$

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

$$\Rightarrow 3y = 27$$

$$\Rightarrow y = \frac{27}{3} = 9\text{ cm}$$

Hence, $x = 6\text{ cm}$, $Y = 9\text{ cm}$.

(ii) In II gm RUNS

$$y + 7 = 20 \quad \dots(i) \text{ (The diagonals of a parallelogram bisect each other.)}$$

$$x + y = 16 \quad \dots(ii)$$

From equation (i),

$$y + 7 = 20 \Rightarrow y = 20 - 7 = 13$$

Putting $y = 13$ in equation (ii),

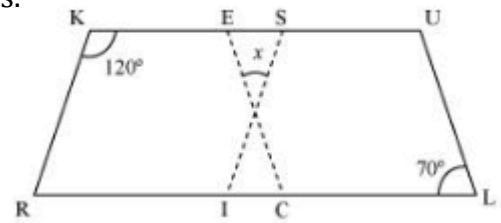
$$x + 13 = 16$$

$$\Rightarrow x = 16 - 13 = 3$$

Hence, $x = 3\text{ cm}$ and $y = 13\text{ cm}$.

Q.9 In the above figure both RISK and CLUE are parallelograms.

Find the value of x .



Sol: In \parallel^{gm} RISK

$$\angle RIS = \angle K$$

$$\angle RIS = 120^\circ \text{ (Opposite angles of a parallelogram are equal.)}$$

$$\angle m + \angle 120^\circ = 180^\circ \text{ (Sum of linear pairs)}$$

$$\angle m = 180^\circ - 120^\circ = 60^\circ$$

$$\text{and } \angle ECI = \angle ECI = 180^\circ \text{ (Corresponding angles)}$$

$$m + n + \angle ECI = 180 \text{ (Angles sum property of triangle)}$$

$$60^\circ + n + 70^\circ = 180^\circ$$

$$130^\circ + n = 180^\circ$$

$$n = 180^\circ - 130^\circ$$

$$n = 50^\circ$$

$$x = n = 50^\circ \text{ (Vertically opposite angles)}$$

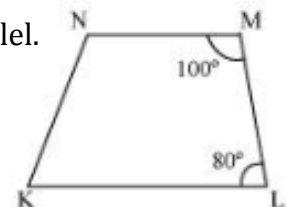
$$x = 50^\circ.$$

Q.10 Explain how this figure is a trapezium. Which of its two sides are parallel?

Sol: $\angle M + \angle L = 100^\circ + 80^\circ = 180^\circ$ (Sum of interior opposite angles is 180°)

Since, sum of co - interior angles is 180° and Lines NM and KL are parallel.

Hence, KLMN is a trapezium.



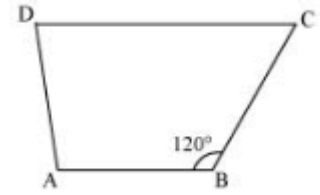
Q.11 Find $m\angle C$ in figure if $\overline{AB} \parallel \overline{DC}$,

Sol: $\angle B + \angle C = 180^\circ$ (Angles on the same side of transversal)

Since $DC \parallel AB$

$$120^\circ + m\angle C = 180^\circ$$

$$m\angle C = 180^\circ - 120^\circ = 60^\circ.$$



Q.12 Find the measure of $\angle P$ and $\angle S$ if $\overline{SP} \parallel \overline{RQ}$ in given figure. (If you find $m\angle R$, is there more than one method to find $m\angle P$) ?

Sol: $\angle P + \angle Q = 180^\circ$ (Sum of co-interior angles is 180°)

$$\angle P + 130^\circ = 180^\circ$$

$$\angle P = 180^\circ - 130^\circ = 50^\circ$$

$$\angle R = 90^\circ \text{ (given)}$$

$$\angle S + 90^\circ = 180^\circ$$

$$\angle S = 180^\circ - 90^\circ = 90^\circ \text{ each}$$

Or

Yes, angle sum property of quadrilateral.

$$\angle S + \angle R + \angle Q + \angle P = 360^\circ$$

$$90^\circ + 90^\circ + 130^\circ + \angle P = 360^\circ$$

$$310^\circ + \angle P = 360^\circ$$

$$\angle P = 360^\circ - 310^\circ$$

$$\angle P = 50^\circ.$$

