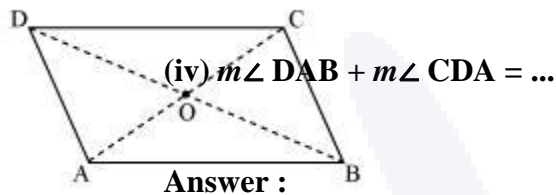# CLASS VIII: Maths
Chapter 3: Understanding Quadrilaterals

Questions and Solutions | Exercise 3.3 - NCERT Books

Q1 :

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

(iv) $m\angle$ **DAB** + $m\angle$ **CDA = ...**

Answer :

(i) AD = ...

(ii) ∠ DCB = ...

(iii) OC = ...

(i) In a parallelogram, opposite sides are equal in length.

AD = BC

(ii) In a parallelogram, opposite angles are equal in measure.

∠ DCB = ∠ DAB

(iii) In a parallelogram, diagonals bisect each other.

Hence, OC = OA

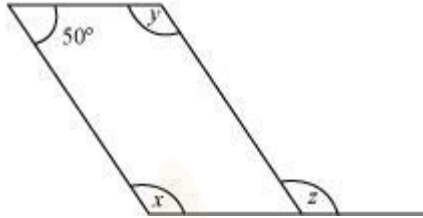(iv) In a parallelogram, adjacent angles are supplementary to each other.

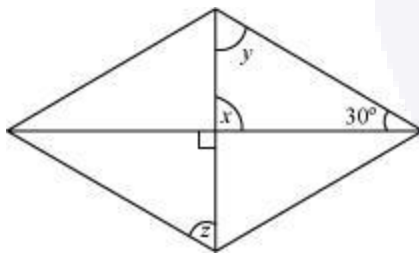Hence, $m\angle$ DAB +$m\angle$ CDA =180°

Q2 :

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

(i)
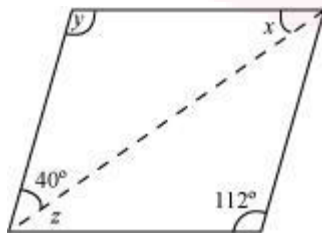

(ii)

(iii)

(iv)

(v)

Answer :

(i) $x + 100° = 180°$ (Adjacent angles are supplementary)

$x = 80°$

$z = x = 80°$(Opposite angles are equal)

$y = 100°$ (Opposite angles are equal)

(ii) $50° + y = 180°$ (Adjacent angles are supplementary)

$y = 130°$

$x = y = 130°$ (Opposite angles are equal)

$z = x = 130°$ (Corresponding angles)

(iii) $x = 90°$ (Vertically opposite angles)

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

$120° + y = 180°$

$y = 60°$

$z = y = 60°$ (Alternate interior angles)

(iv) $z = 80°$ (Corresponding angles)

$y = 80°$ (Opposite angles are equal)

$x + y = 180°$ (Adjacent angles are supplementary)

$x = 180° - 80° = 100°$

(v) $y = 112°$ (Opposite angles are equal)

$x + y + 40° = 180°$ (Angle sum property of triangles)

$x + 112° + 40° = 180°$

$x + 152° = 180°$

$x = 28°$

$z = x = 28°$ (Alternate interior angles)

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Q3 :

Can a quadrilateral ABCD be a parallelogram if

(i) ∠ D + ∠ B = 180°

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

(iii) ∠ A = 70° and ∠ C = 65°

Answer :

(i) For ∠ D + ∠ B = 180°, quadrilateral ABCD may or may not be a parallelogram. Along with this condition, the following conditions should also be fulfilled.

The sum of the measures of adjacent angles should be 180º.

Opposite angles should also be of same measures.

(ii) No. Opposite sides AD and BC are of different lengths.

(iii) No. Opposite angles A and C have different measures.

Q4 :

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

Answer :

Here, quadrilateral ABCD (kite) has two of its interior angles, ∠ B and ∠ D, of same measures. However, still the quadrilateral ABCD is not a parallelogram as the measures of the remaining pair of opposite angles, ∠ A and ∠ C, are not equal.
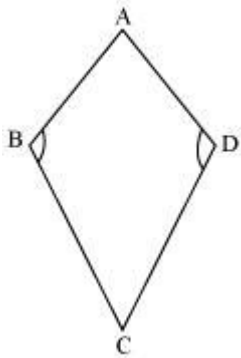
Q5 :

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.

Answer :

Let the measures of two adjacent angles, ∠A and ∠B, of parallelogram ABCD are in the ratio of 3:2. Let ∠A = $3x$ and ∠B = $2x$

We know that the sum of the measures of adjacent angles is 180 º for a parallelogram.

∠A + ∠B = 180 º

$3x + 2x = 180$ º

$5x = 180$ º

$$x = \frac{180º}{5} = 36º$$

∠A = ∠C = $3x$ = 108 º (Opposite angles)

∠B = ∠D = $2x$ = 72 º (Opposite angles)

Thus, the measures of the angles of the parallelogram are 108 º, 72 º, 108 º, and 72 º.

Q6 :

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

Answer :

Sum of adjacent angles = 180°

∠ A + ∠ B = 180º

2∠ A = 180º (∠ A = ∠ B)

∠ A = 90º

∠ B = ∠ A = 90º

∠ C = ∠ A = 90º (Opposite angles)
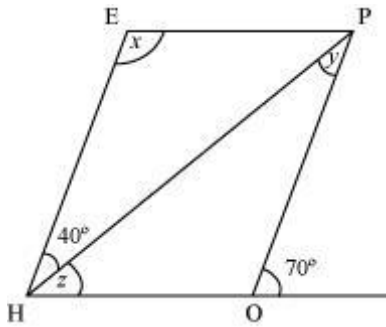
∠ D = ∠ B = 90º (Opposite angles)

Thus, each angle of the parallelogram measures 90º.

Q7 :

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

$y = 40°$ (Alternate interior angles)

$70° = z + 40°$ (Corresponding angles)

$70° - 40° = z$

$z = 30°$

$x + (z + 40°) = 180°$ (Adjacent pair of angles)
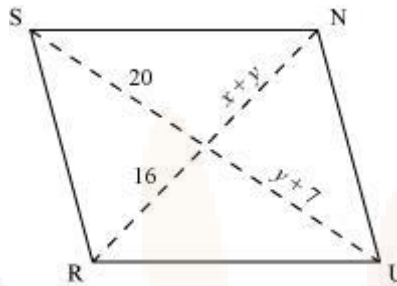
$x + 70° = 180°$

$x = 110°$

Q8 :

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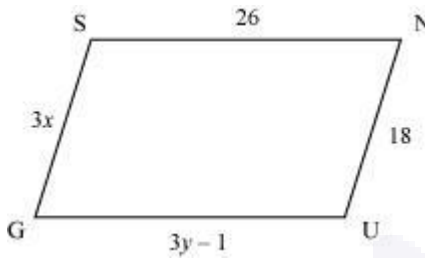
(i)   (ii)

Answer :

(i)We know that the lengths of opposite sides of a parallelogram are equal to each other.

GU = SN

3y - 1 = 26

3y = 27

y = 9

SG = NU

3x = 18

x = 6

Hence, the measures of x and y are 6 cm and 9 cm respectively.

(ii)We know that the diagonals of a parallelogram bisect each other.
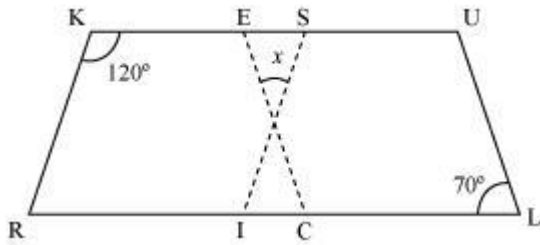
y + 7 = 20

y = 13

x + y = 16

x + 13 = 16

x = 3

Hence, the measures of x and y are 3 cm and 13 cm respectively.

Q9 :

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

Answer :

Adjacent angles of a parallelogram are supplementary.

In parallelogram RISK, ∠ RKS + ∠ ISK = 180°

120° + ∠ ISK = 180°

∠ ISK = 60°

Also, opposite angles of a parallelogram are equal.

In parallelogram CLUE, ∠ ULC = ∠ CEU = 70°
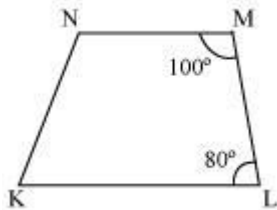
The sum of the measures of all the interior angles of a triangle is 180°.

$x + 60° + 70° = 180°$

$x = 50°$

Q10 :

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

Answer :

If a transversal line is intersecting two given lines such that the sum of the measures of the angles on the same side of transversal is 180°, then the given two lines will be parallel to each other.

Here, ∠ NML + ∠ MLK = 180°

Hence, NM∥LK

As quadrilateral KLMN has a pair of parallel lines, therefore, it is a trapezium.

Q11 : **Find $m\angle C$ in the following figure if $\overline{AB}\parallel\overline{DC}$**
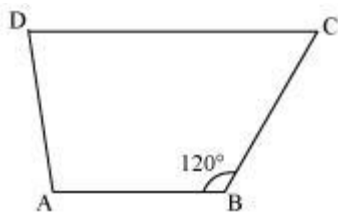
Answer :

Given that, $\overline{AB}\parallel\overline{DC}$
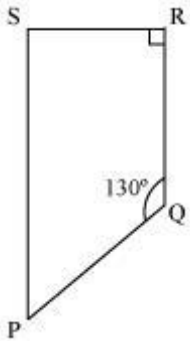
∠B + ∠C = 180° (Angles on the same side of transversal)

120 ° + ∠C = 180°

∠C = 60°

Q12 :

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

Answer :

∠ P + ∠ Q = 180° (Angles on the same side of transversal)

∠ P + 130° = 180°

∠ P = 50°

∠ R + ∠ S = 180° (Angles on the same side of transversal)

90° + ∠ R = 180°

∠ S = 90°

Yes. There is one more method to find the measure of $m\angle$ P.

$m\angle$ R and $m\angle$ Q are given. After finding $m\angle$ S, the angle sum property of a quadrilateral can be applied to find $m\angle$ P.