Chapter 8 Quadrilaterals Class 9 Important Questions NCERT MATHS

Q.1 **In a rectangle, one diagonal is inclined to one of its sides at 25°. Measure the acute angle between the two diagonals.**

Solution:

Let ABCD be a rectangle where AC and BD are the two diagonals which are intersecting at point O.

Now, assume ∠BDC = 25° (given)

Now, ∠BDA = 90° − 25° = 65°

Also, ∠DAC = ∠BDA, (as diagonals of a rectangle divide the rectangle into two congruent right triangles)

So, ∠BOA = the acute angle between the two diagonals = 180° − 65° − 65° = 50°

Q.2. Is it possible to draw a quadrilateral whose all angles are obtuse angles?

Solution:

It is known that the sum of angles of a quadrilateral is always 360°. To have all angles as obtuse, the angles of the quadrilateral will be greater than 360°. So, it is not possible to draw a quadrilateral whose all angles are obtuse angles.

Q.2 Prove that the angle bisectors of a parallelogram form a rectangle.

Solution:

LMNO is a parallelogram in which bisectors of the angles L, M, N, and O intersect at P, Q, R and S to form the quadrilateral PQRS.
LM || NO (opposite sides of parallelogram LMNO)
L + M = 180 (sum of consecutive interior angles is 1800)
MLS + LMS = 90
In LMS, MLS + LMS + LSM = 180
90 + LSM = 180
LSM = 90
RSP = 90 (vertically opposite angles)
SRQ = 90, RQP = 90 and SPQ = 90
Therefore, PQRS is a rectangle.

Q3. In a trapezium ABCD, AB∥CD. Calculate ∠C and ∠D if ∠A = 55° and ∠B = 70°

Solution:

In a trapezium ABCD, ∠A + ∠D = 180° and ∠B + ∠C = 180°

So, 55° + ∠D = 180°

Or, ∠D = 125°

Similarly,

70° + ∠C = 180°

Or, ∠C = 110°

Q4. Calculate all the angles of a parallelogram if one of its angles is twice its adjacent angle.

Solution:

Let the angle of the parallelogram given in the question statement be "x".

Now, its adjacent angle will be 2x.

It is known that the opposite angles of a parallelogram are equal.

So, all the angles of a parallelogram will be x, 2x, x, and 2x

As the sum of interior angles of a parallelogram = 360°,

x + 2x + x + 2x = 360°

Or, x = 60°

Thus, all the angles will be 60°, 120°, 60°, and 120°.

Q5. Calculate all the angles of a quadrilateral if they are in the ratio 2:5:4:1.

Solution:

As the angles are in the ratio 2:5:4:1, they can be written as-

2x, 5x, 4x, and x

Now, as the sum of the angles of a quadrilateral is 360°,

2x + 5x + 4x + x = 360°

Or, x = 30°

Now, all the angles will be,

2x =2 × 30° = 60°

5x = 5 × 30° = 150°

4x = 4 × 30° = 120°, and

x = 30°