Chapter – 03

Understanding Quadrilaterals

Exercise 3.3

Question 1. State whether True or False

(a) All rectangles are squares

(b) All rhombuses are parallelograms

(c) All squares are rhombuses and also rectangles

(d) All squares are not parallelograms

(e) All kites are rhombuses

(f) All rhombuses are kites

(g) All parallelograms are trapeziums

(h) All squares are trapeziums

Answer:

(a) False. All squares are rectangles but all rectangles are not squares

(b) True. Opposite sides of a rhombus are equal and parallel to each other

(c) As all sides of square are equal and the diagonals intersect at right angles, all squares are rhombus. And also opposite sides of square are equal and all angles are right angles, therefore all squares are also rectangles.

(d) False.

All squares are parallelograms as opposite sides are equal and parallel

(e) False.

A kite does not have all sides of the same length

Therefore, all kites aren't rhombus

(f) True.

A rhombus also has two distinct consecutive pairs of sides of equal length

(g) True. All parallelograms have a pair of parallel sides

(h) True. All squares have a pair of parallel sides

Question 2. Identify all the quadrilaterals that have.

(a) Four sides of equal length

(b) Four right angles

Answer:

(a) Rhombus and Square are the quadrilaterals that have 4 sides of equal length

(b) Square and rectangle are the quadrilaterals that have 4 right angles

Question 3. Explain how a square is

(i) a quadrilateral

(ii) a parallelogram

(iii) a rhombus

(iv) a rectangle

Answer:

Properties of Square:

1. Each Interior Angle = 90º.

2. Each Side is equal.

3. Diagonals bisect each other.

4. Opposite sides are parallel.

(i) A square is a quadrilateral since it has four sides

(ii) A square is a parallelogram since its opposite sides are parallel to each other

(iii) A square is a rhombus because its four sides are of the same length

(iv) A square is a rectangle because its each interior angle measures 90°

Question 4. Name the quadrilaterals whose diagonals

(i) Bisect each other

(ii) Are perpendicular bisectors of each other

(iii) Are equal

Answer:

(i) The diagonals of a parallelogram, rhombus, square, and rectangle bisect each other

(ii) The diagonals of a rhombus and square act as perpendicular bisectors

(iii) The diagonals of a rectangle and square are equal

Question 5. Explain why a rectangle is a convex quadrilateral

Answer: In a rectangle, there are two diagonals, both lying in the interior of the rectangle

Hence, it is a convex quadrilateral

Question 6. ABC is a right-angled triangle and O is the mid-point of the side opposite to the right angle. Explain why O is equidistant from A,B and C. (The dotted lines are drawn additionally to help you).

Answer:

Draw lines AD and DC such that AD||BC, AB||DC

AD = BC, AB = DC

ABCD is a rectangle as opposite sides are equal and parallel to each other and all the interior angles are of 90o

In a rectangle, diagonals are of equal length and also these bisect each other

Hence, AO = OC = BO = OD

Thus, O is equidistant from A, B, and C