Understanding Quadrilaterals: Exercise 3.4

Q.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.
Sol. (a) All rectangles are squares: **False**
(b) All rhombuses are parallelograms: **True**
(c) All squares are rhombuses and also rectangles: **True**
(d) All squares are not parallelograms: **False**
(e) All kites are rhombuses: **False**
(f) All rhombuses are kites: **True**
(g) All parallelograms are trapeziums: **True**
(h) All squares are trapeziums: **True**

Q.2 Identify all the quadrilaterals that have.
(a) Four sides of equal length
(b) four right angles
Sol. (a) Four sides of equal length: Rhombus and Square
(b) Four right angles: Square and rectangle

Q.3 Explain how a square is.
(i) a quadrilateral
(ii) a parallelogram
(iii) a rhombus
(iv) a rectangle
Sol. (i) A square has four sides. So, it is a quadrilateral.

(ii) Since, opposite sides of a square are parallel to each other. So, it is a parallelogram.

(iii) Since, square has four equal sides and its diagonals bisect perpendicularly to each other. So, it is a rhombus.

(iv) Since, each interior angle of a square is 90°. So it is a rectangle.

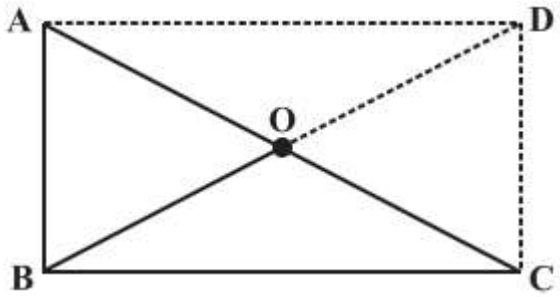
Q.4 Name the quadrilaterals whose diagonals.
(i) bisect each other (ii) are perpendicular bisectors of each other (iii) are equal.
Sol. (i) Rhombus, parallelogram, rectangle and square are the name of the quadrilaterals whose diagonals bisect each other.

(ii) Rhombus and square are the name of quadrilaterals whose diagonals are perpendicular bisectors of each other.
(iii) Square and rectangle are the name of quadrilaterals whose diagonals are equal.

Q.5 Explain why a rectangle is a convex quadrilateral.

Sol. Since, both the diagonals of rectangle lies in its interior part. So, a rectangle is a convex quadrilateral.

Q.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).



Sol. In given right-angled triangle ABC, draw lines AD and DC such that AB || CD and BC || AD. Also, AD = BC and AB = DC.

Therefore, obtained figure ABCD is a rectangle because it's opposite sides are equal and parallel to each other and all the interior angles are of 90^{o}.

As we know that in rectangle, both the diagonals are of equal length and they bisect each other.

So, AO = OC = BO = OD.

From above, it is proved that O is equidistant from A, B and C.