CHAPTER 3

VIII CLASS-NCERT(2024-25)

Understanding Quadrilaterals (Notes)

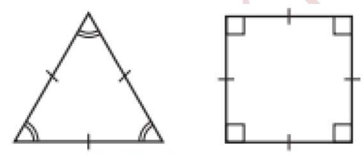
PREPARED BY : BALABHADRA SURESH
HTTPS://SURESHMATHSMATERIAL.COM/

1. **Simple curve**: A simple curve is a curve that does not cross itself
2. **Simple closed curve:** A curve which starts and ends at the same point without crossing itself is called a simple closed curve.
3. **Polygons**: A simple closed curve made up of only line segments is called a polygon
4. **Convex polygon**: A Convex polygon is defined as a polygon with no portions of their diagonals in their exteriors.
5. **Concave polygon:** a polygon that has at least one interior angle greater than 180 degrees

(or) A concave polygon is a polygon which is not convex.

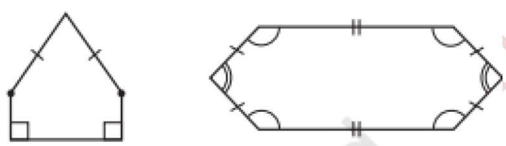
6. **Regular polygon:** Regular polygons have all sides equal in length and all angles are equal.

Ex: Equilateral triangle , Square,…



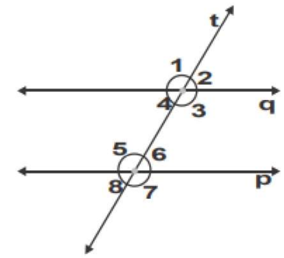
7. **Irregular polygon:** An irregular polygon does not have all sides equal also all angles are not equal.

Ex: Scalene triangle, Right triangle,….



Polygons that are not regular

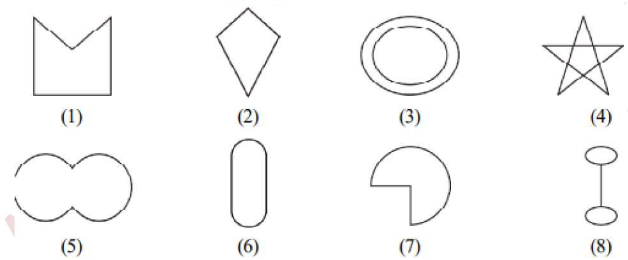
8. **Angle sum property of triangle**: The sum of the measures of the three angles of a triangle is 180°.
9. **Angle sum property of quadrilateral:** The sum of measures of the four angles of a quadrilateral is 360^0.
10. **Complementary angles**: Ifthesumoftwoanglesis90^0 ,then the angles are called as complementary angles to each other
11. **Supplementary angles**: If the sum of two angles is 180^0 , then the angles are called as supplementary angles to each other.
12. **Conjugate angles**: If the sum of two angles is 360^0 , then the angles are called as conjugate angles to each other.
13. **Linear pair of angles:** "A pair of adjacent angles whose sum is 180^0 is called linear pair of angles.
14.

Interior angles	$\angle 3, \angle 4, \angle 5, \angle 6$	
Exterior angles	$\angle 1, \angle 2, \angle 7, \angle 8$	
Corresponding angles are equal	$\angle 1 = 5, \angle 2 = \angle 6,$ $\angle 3 = \angle 7, \angle 4 = \angle 8$	
Alternate interior angles are equal	$\angle 3 = \angle 5, \angle 4 = \angle 6$	
Alternate exterior angles are equal	$\angle 1 = \angle 7, \angle 2 = \angle 8$	
Interior angles on same side of transversal(co-interior angles) are supplementary	$\angle 3 + \angle 6 = 180^0$ $\angle 4 + \angle 5 = 180^0$	
Exterior angles on same side of transversal(co-exterior angles) are supplementary	$\angle 1 + \angle 8 = 180°$ $\angle 2 + \angle 7 = 180°$	

EXERCISE 3.1

1. Given here are some figures.

Classify each of them on the basis of the following.



(a) Simple curve: (1), (2),(5),(6) and (7)

(b) Simple closed curve: (1), (2),(5),(6) and (7)

(c) Polygon: (1),(2)

(d) Convex polygon: (2)

(e) Concave polygon:(1)

5. What is a regular polygon? State the name of a regular polygon of

(i) 3 sides→ Equilateral triangle

(ii) 4 sides → Square

(iii) 6 sides→ Regular Hexagon

Sum of the Measures of the Exterior Angles of a Polygon

* The sum of the measures of the external angles of any polygon is 360°

Example 1: Find measure x

Sol: The sum of the external angles of any polygon = 360°

$$x + 90^0 + 50^0 + 110^0 = 360^0$$

$$x + 250^0 = 360^0$$

$$x = 360^0 - 250^0$$

$$x = 110^0$$

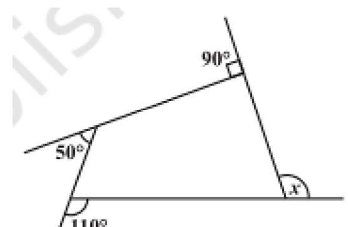


Fig 3.9

TRY THESE

1. What is the sum of the measures of its exterior angles x, y, z, p, q, r?

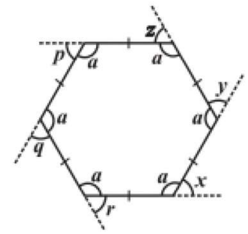
Sol: The sum of the measures of the external angles of any polygon is 360°

So, $x + y + z + p + q + r = 360^0$

Sum of the all interior angles of a hexagon$=(6-2)\times 180^0$

$$= 4\times 180^0 = 720^0$$

$6a = 720^0 \Rightarrow a = \frac{720^0}{6} = 120^0$



(or)

Each interior angle of a regular hexagon $= \dfrac{(n-2)\times 180^0}{6}$

$= \dfrac{(6-2)\times 180^0}{6} = 4\times 30^0 = 120^0$

$\therefore a = 120^0$

2. Is x = y = z = p = q = r? Why?

Sol: $x + a = 180^0$(Linear pair)

$\Rightarrow x + 120^0 = 180^0$

$\Rightarrow x = 180^0 - 120^0$

$\Rightarrow x = 60^0$

Similarly

$y = 180^0 - 120^0 = 60^0$

$z = 180^0 - 120^0 = 60^0$

$p = 180^0 - 120^0 = 60^0$

$q = 180^0 - 120^0 = 60^0$

$r = 180^0 - 120^0 = 60^0$

Yes, $x = y = z = p = q = r$

3. **What is the measure of each?**

(i) Exterior angle$=60^0$ (ii) Interior angle$= 120^0$

Each external angle of a regular polygon with n sides $= \dfrac{360°}{n}$

Each interior angle of a regular polygon with 'n' sides $= \dfrac{(n-2)\times 180^0}{n}$

Example 2: Find the number of sides of a regular polygon whose each exterior angle has a measure of 45°.

Sol: Total measure of all exterior angles = 360°

Measure of each exterior angle = 45°

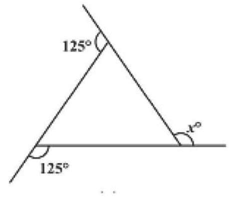
The number of exterior angles $= \dfrac{360°}{45°} = 8$

The polygon has 8 sides.

EXERCISE 3.2

1. Find x in the following figures.

(a) Total measure of all exterior angles = 360°



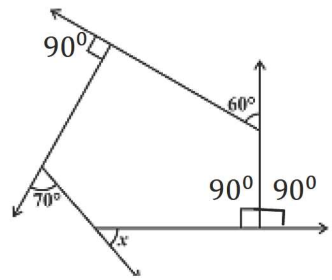
$x^0 + 125^0 + 125^0 = 360^0$

$x^0 + 250^0 = 360^0$

$x^0 = 360^0 - 250^0$

$x^0 = 110^0$

(b)) **Total measure of all exterior angles = 360°**



$x^0 + 90^0 + 60^0 + 90^0 + 70^0 = 360^0$

$x^0 + 310^0 = 360^0$

$x^0 = 360^0 - 310^0$

$x^0 = 50^0$

2. Find the measure of each exterior angle of a regular polygon of

(i) 9 sides

Sol: Total measure of all exterior angles = 360°

Each exterior angle of a regular polygon of 9 sides $= \frac{360°}{9} = 40°$

(ii) 15 sides

Sol: Total measure of all exterior angles = 360°

Each exterior angle of a regular polygon of 15 sides $= \frac{360°}{15} = 24°$

3. **How many sides does a regular polygon have if the measure of an exterior angle is 24°?**

Sol: Total measure of all exterior angles = 360°

Measure of each exterior angle = 24°

The number of exterior angles $= \frac{360°}{24°} = 15$

The polygon has 15 sides.

4. **How many sides does a regular polygon have if each of its interior angles is 165°?**

Sol: Total measure of all exterior angles = 360°

Measure of each interior angle = 165°

Measure of each exterior angle = 180° − 165° = 15°

The number of exterior angles $= \frac{360°}{15°} = 24$

The polygon has 24 sides.

5. (a) Is it possible to have a regular polygon with measure of each exterior angle as 22°?

Sol: Measure of each exterior angle as 22°

Total measure of all exterior angles = 360°

The number of exterior angles $= \frac{360°}{22°}$ it is not a natural number

So, we cannot have regular polygon with each exterior angle = 22°

(b) Can it be an interior angle of a regular polygon? Why?

Sol: Measure of each interior angle as 22°

Measure of each exterior angle $=180^0 - 22° = 158°$

Total measure of all exterior angles $= 360°$

The number of exterior angles $= \frac{360°}{158°}$ *it is not a natural number*

So, we cannot have regular polygon with each interior angle $= 22°$

6. (a) What is the minimum interior angle possible for a regular polygon? Why?

Sol: Equilateral triangle with 3 sides is the least regular polygon.

The interior angle of equilateral triangle $= \frac{180°}{3} = 60°$

Thus, minimum interior angle possible for a regular polygon $= 60°$

(b) What is the maximum exterior angle possible for a regular polygon?

Sol: Equilateral triangle is regular polygon with 3 sides has maximum exterior angle.

The interior angle of equilateral triangle $= 60°$

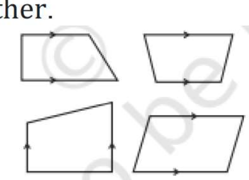
The exterior angle of equilateral triangle $= 180° - 60° = 120°$

Thus, the maximum exterior angle possible for a regular polygon is 120°.

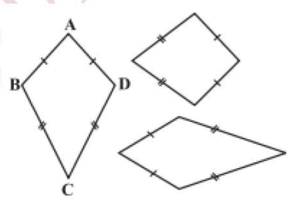
Kinds of Quadrilaterals

1. **Trapezium**: Trapezium is a quadrilateral with a pair of parallel sides.

2. **Kite:** A kite is a quadrilateral that has 2 pairs of equal-length sides and these sides are adjacent to each other.



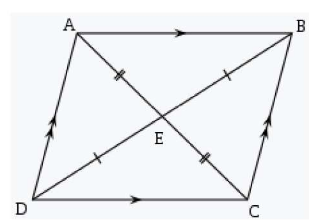
These are trapeziums



These are kites

3. **Parallelogram:** A parallelogram is a quadrilateral whose opposite sides are parallel.

Properties:



(i) Opposite sides are equal and parallel

AB=DC ,BC=AD and $AB \parallel DC$, $BC \parallel AD$

(ii) Opposite angles are equal.

$\angle A = \angle C$ and $\angle B = \angle D$

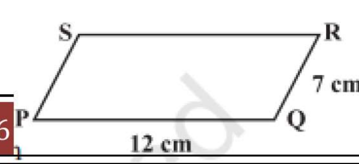
(iii) Diagonal are bisect each other.

AE=EC and BE=ED

(iv) The adjacent angles in a parallelogram are supplementary.

$\angle A + \angle B = 180^0$; $\angle B + \angle C = 180^0$; $\angle C + \angle D = 180^0$; $\angle D + \angle A = 180^0$

Example 3: Find the perimeter of the parallelogram PQRS



Sol: In a parallelogram opposite sides are equal

PQ=RS=12cm and QR=PS=7cm

So, Perimeter = PQ + QR + RS + SP

= 12 cm + 7 cm + 12 cm + 7 cm = 38 cm

Example 4: BEST is a parallelogram. Find the values x, y and z.

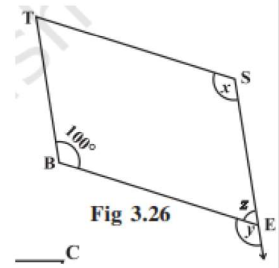


Fig 3.26

Sol: $x = 100^0$ (In a parallelogram opposite angles are equal)

$y = 100^0$ (Interior alternate angles)

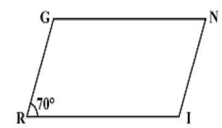
$z + y = 180^0$(Linear pair)

$z + 100^0 = 180^0$

$z = 180^0 - 100^0 = 80^0$

$\therefore x = 100^0, y = 100^0, z = 80^0$

Example 5: In a parallelogram RING if m∠R = 70°, find all the other angles



Sol: m∠R = 70°

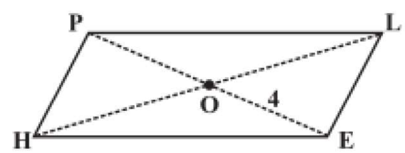
m∠R+ m∠I=180°(adjacent angles in a parallelogram are supplementary)

m∠I=180°− 70°=110°

m∠N=m∠R = 70° (Opposite angles are equal)

m∠I= m∠G= 110°(Opposite angles are equal)

Example 6: In Fig 3.31 HELP is a parallelogram. (Lengths are in cms). Given that OE = 4 and HL is 5 more than PE? Find OH.



Sol: Given that OE = 4 cm

OE=OP=4 cm (Diagonals are bisect each other)

PE=4+4=8 cm

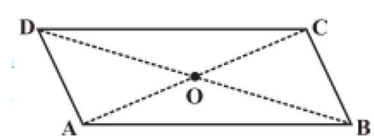
Given HL is 5 more than PE

HL=PE+5=8+5=13 cm

$OH = OL = \frac{1}{2} \times HL = \frac{1}{2} \times 13 = 6.5$ cm

EXERCISE 3.3

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



(i) AD = BC (In a parallelogram opposites sides are equal)

(ii) ∠ DCB = ∠ DAB (In a parallelogram opposites angles are equal

(iii) OC = OA (Diagonals are bisect each other)

(iv) m ∠DAB + m ∠CDA = 180^0(Adjacent angles in a parallelogram are supplementary)

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

(i)

Sol: Adjacent angles in a parallelogram are supplementary

$x + 100^0 = 180^0$

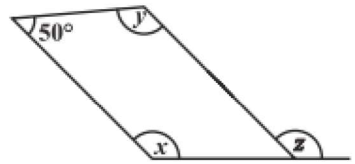
$x = 180^0 - 100^0$

$x = 80^0$

In parallelogram opposite angles are equal

$x = z = 80^0$ and $y = 100^0$

(ii)



Sol: Adjacent angles in a parallelogram are supplementary

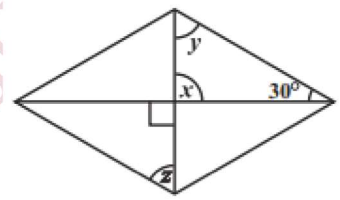
$x + 50^0 = 180^0$

$x = 180^0 - 50^0$

$x = 130^0$

$y = x = 130^0$ (Opposite angles are equal)

$z = x = 130^0$(Corresponding angles)



(iii)

Sol: $x = 90^0$(Vertically opposite angles)

$x + y + 30^0 = 180^0$(Angle sum property of triangle)

$90^0 + y + 30^0 = 180^0$

$y + 120^0 = 180^0$

$y = 180^0 - 120^0 = 60^0$

$z = y = 60^0$(Alternate interior angles)

(iv)

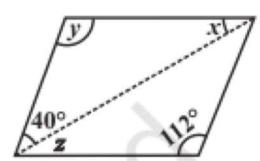
Sol: $x + 80^0 = 180^0$(Adjacent angles are supplementary)

$x = 180^0 - 80^0 = 100^0$

$y = 80^0$ (Opposite angles are equal)

$z = 80^0$(Corresponding angles)

(v)



Sol: $y = 112^0$(Opposite angles are equal)

$x + y + 40^0 = 180^0$(Angle sum property of triangle)

$x + 112^0 + 40^0 = 180^0$

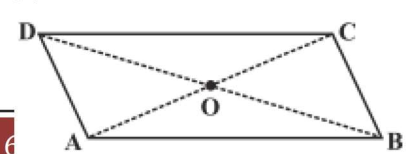
$x + 152^0 = 180^0$

$x = 180^0 - 152^0 = 28^0$

$z = x = 28^0$(Alternate interior angles)

$\therefore x = 28^0, y = 112^0, z = 28^0$

3. 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°?



(i) ∠D + ∠B = 180°?

Sol: Need not be a parallelogram.

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

Sol: Here AD≠BC ⇒ one pair of opposite sides are not equal

So, ABCD is not a parallelogram.

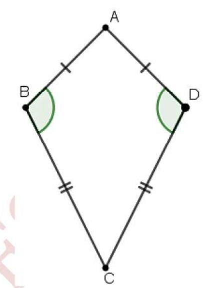
(iii) ∠A = 70° and ∠C = 65°?

Sol: Here ∠A≠∠C⇒ opposite angles are not equal

So, ABCD is not a parallelogram

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

Sol:



In ABCD, m∠B=m∠D

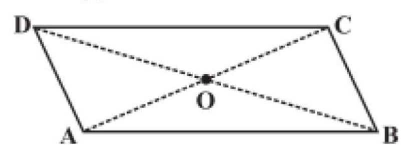
ABCD is not a parallelogram.

5. 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.

Sol: The ratio of the measures of two adjacent angles of a parallelogram=3:2

Let the angles be $3x$ *and* $2x$

$3x + 2x = 180^0$ (Adjacent angles in a parallelogram are supplementary)



$5x = 180^0$

$x = \frac{180^0}{5} = 36^0$

$\angle A = \angle C = 3x = 3 \times 36^0 = 108^0$

$\angle B = \angle D = 2x = 2 \times 36^0 = 72^0$

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

Sol: Let the two adjacent angles be x, x

$x + x = 180^0$

$2x = 180^0$

$x = \frac{180^0}{2} = 90^0$

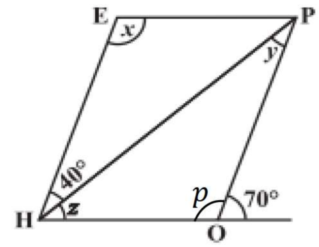
$\angle A = \angle C = 90^0$

$\angle B = \angle D = 180^0 - 90^0 = 90^0$

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

Sol: $p + 70^0 = 180^0$(Linear pair)

$\Rightarrow p = 180^0 - 70^0 = 110^0$



$x = p = 110^0$ (Opposite angles are equal)

$y = 40^0$ (Alternate interior angles)

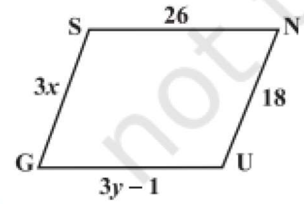
$z + 40^0 = 70^0$(Corresponding angles)

$\Rightarrow z = 70^0 - 40^0 = 30^0$

$\therefore x = 110^0, y = 40^0, z = 30^0$

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

(i) Sol: $3x = 18$(Opposite sides are equal)



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

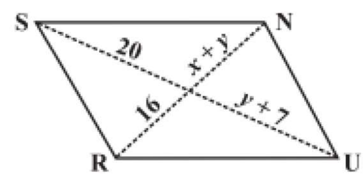
$3y - 1 = 26$ (Opposite sides are equal)

$\Rightarrow 3y = 26 + 1 = 27$

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

$\therefore x = 6 , y = 9$

(ii)



Sol: $y + 7 = 20$ (Diagonals are bisect each other)

$\Rightarrow y = 20 - 7 = 13$

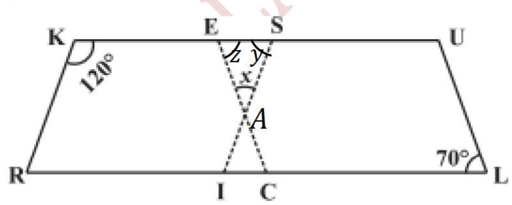
$x + y = 16$ (Diagonals are bisect each other)

$x + 13 = 16$

$x = 16 - 13 = 3.$

$\therefore x = 3 , y = 13$

9.



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

Sol: Let ∠ISK= y , ∠CEU=z

In parallelogram RISK

$y + 120^0 = 180^0$(Adjacent angles in a parallelogram are supplementary)

$y = 180^0 - 120^0 = 60^0$

$z = 70^0$(Opposite angles are equal)

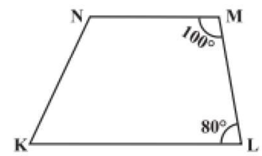
$x + y + z = 180^0$(Angle sum property of a triangle)

$x + 60^0 + 70^0 = 180^0$

$x + 130^0 = 180^0$

$x = 180^0 - 130^0 = 50^0$

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



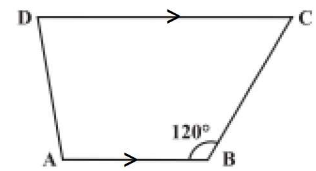
Sol: (i) $\angle L + \angle M = 100^0 + 80^0 = 180^0$.

$\Rightarrow$ Interior angles are on the same side of the transversal LN are supplementary.

$\Rightarrow KL \parallel NM$

In KLMN one pair of opposite sides are parallel.

So, KLMN is a trapezium.



11. Find m∠C in if $\overline{AB} \parallel \overline{DC}$

Sol: $\overline{AB} \parallel \overline{DC}$

$\angle B + \angle C = 180^0$(Co-interior angles are supplementary)

$120^0 + \angle C = 180^0$

$\angle C = 180^0 - 120^0 = 60^0$

12. Find the measure of ∠P and ∠S if $\overline{SP} \parallel \overline{RQ}$ in Fig 3.34. (If you find m∠R, is there more than one method to find m∠P?)

Sol: $\overline{SP} \parallel \overline{RQ}$, $\angle R = 90^0$

$\angle S + \angle R = 180^0$(Co-interior angles are supplementary)

$\angle S + 90^0 = 180^0$

$\angle S = 180^0 - 90^0 = 90^0$

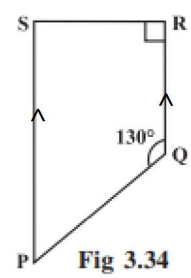


Fig 3.34

$\angle P + \angle Q + \angle R + \angle S = 360^0$(Angle sum property of quadrilateral)

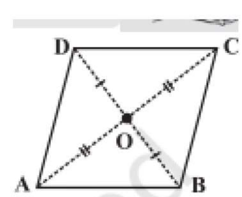
$\angle P + 130^0 + 90^0 + 90^0 = 360^0$

$\angle P + 310^0 = 360^0$

$\angle P = 360^0 - 310^0 = 50^0$

Some Special Parallelograms

Rhombus: A rhombus is a quadrilateral whose four sides of equal length.



Properties:

(i) All four sides are equal

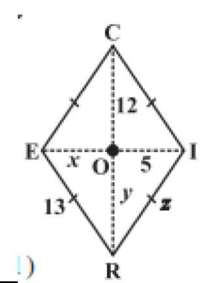
AB=BC=CD=DA

(ii) Opposite angles are equal

$\angle A = \angle C$ and $\angle B = \angle D$

(iii) Diagonals are perpendicular bisector of one another.

$\angle AOB = \angle BOC = \angle COD = \angle AOD = 90^0$ and OA=OC, OB=OD



Example 7: RICE is a rhombus (Fig 3.36). Find x, y, z. Justify your findings

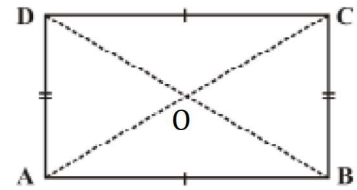
Sol: In a rhombus diagonals are perpendicularly bisect each other

OE=OI and OR=OC

$x = 5$ and $y = 12$

$z = 13$ (In a rhombus all sides are equal)

A rectangle:



A rectangle is a parallelogram with equal angles (right angle).

Properties:

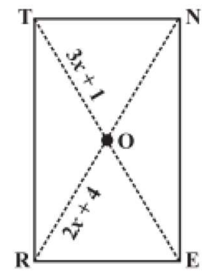
(i) Opposite sides are parallel and equal lengths.

AB=CD and BC=AD

(ii) Diagonals are equal and bisect each other.

AC=BD , OA=OC and OB=OD

(iii) Every angle is right angle (90^0).



Example 8: RENT is a rectangle (Fig 3.41). Its diagonals meet at O. Find x, if OR = 2x + 4 and OT = 3x + 1.

Sol: In a rectangle diagonals are equal and bisect each other.

⇒ All four parts are equal

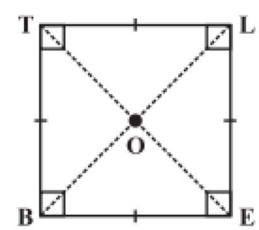
⇒ OT=OE=ON=OR

$\Rightarrow 3x + 1 = 2x + 4$

$\Rightarrow 3x - 2x = 4 - 1$

$\Rightarrow x = 3$

A square:



A square is a rectangle with equal sides.

Properties:

(i) All sides are equal.(BE=EL=LT=TB)

(ii) All angles are right angles.(∠B=∠E=∠L=∠T=90^0)

(iii) Diagonals are equal and perpendicularly bisect each other.

(BL=ET and $\overline{BL} \perp \overline{ET}$, OB=OL and OE=OT)

EXERCISE 3.4

1. State whether True or False.

(a) All rectangles are squares

Sol: False . A rectangle need not have all sides equal. So, it is not a square.

(b) All rhombuses are parallelograms

Sol: True

(c) All squares are rhombuses and also rectangles

Sol: True

(d) All squares are not parallelograms.

Sol: False. All squares are parallelograms.

(e) All kites are rhombuses.

Sol: False .A kite does not have all sides of the same length.

(f) All rhombuses are kites.

Sol: True

(g) All parallelograms are trapeziums.

Sol: True

(h) All squares are trapeziums.

Sol: True.

2. Identify all the quadrilaterals that have.

(a) Four sides of equal length

Sol: Square, Rhombus.

(b) Four right angles

Sol: Square, Rectangle.

3. Explain how a square is.

(i) A quadrilateral

Sol: A square has four sides . So, square is a quadrilateral.

(ii) A parallelogram

Sol: Square is a parallelogram because it's opposite sides are parallel.

(iii) A rhombus

Sol: A square is a rhombus because it's four sides is equal length.

(iv) A rectangle

Sol: A square is a rectangle because it's each angle is right angle.

4. Name the quadrilaterals whose diagonals.

(i) Bisect each other

Sol: Square, Rhombus, Rectangle and parallelogram.

(ii) Are perpendicular bisectors of each other.

Sol: Square, Rhombus.

(iii) are equal

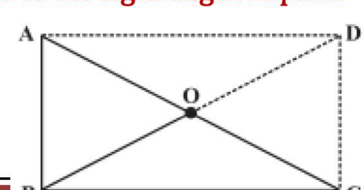
Sol: Square, Rectangle.

5. Explain why a rectangle is a convex quadrilateral.

Sol: A Convex polygon is defined as a polygon with no portions of their diagonals in their exteriors. In rectangle both of its diagonals are lie in its interior .So, a rectangle is a convex quadrilateral

6. ABC is a right-angled triangle and O is the midpoint of the side opposite to the right angle. Explain why O is equidistant from A, B and C.

Sol: Draw $AD \parallel BC \text{ and } CD \parallel BA$



ABCD is a rectangle.

In rectangle diagonals are equal and bisect each other.

OA=OC=OB=OD

So, O is equidistant from A, B and C

THINK, DISCUSS AND WRITE

1. A mason has made a concrete slab. He needs it to be rectangular. In what different ways can he make sure that it is rectangular?

Sol:

(i) By measuring opposite sides (Opposite sides of rectangle are equal)

(ii) By measuring diagonals(Diagonals of a rectangle are equal)

(iii) By measuring each angle(Each angle of a rectangle is 90^0)

2. A square was defined as a rectangle with all sides equal. Can we define it as rhombus with equal angles? Explore this idea.

Sol: Yes, we define a square is a rhombus with equal angles.

Because rhombus has four equal sides and if all angles are equal then each angle is 90^0.so, it becomes a square.

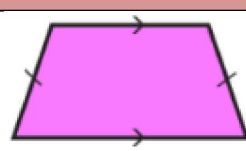
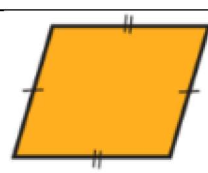
3. Can a trapezium have all angles equal? Can it have all sides equal? Explain.

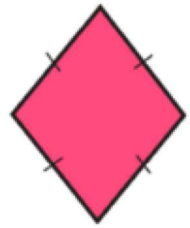
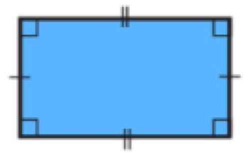
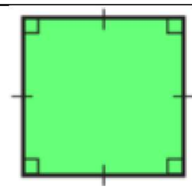
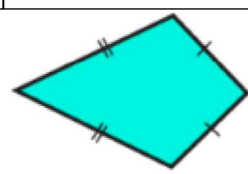
Sol: A trapezium is a quadrilateral with one pair of parallel sides.

A trapezium cannot have all angles equals and all sides equal.

If a trapezium has all angles are equal then it becomes a square or a rectangle

If a trapezium has all sides are equal then it becomes a square or a rhombus.

Quadrilateral	Figure	Properties
Trapezium A quadrilateral with a pair of parallel sides.		1. One pair of parallel lines
Parallelogram: A quadrilateral with each pair of opposite sides parallel		1. Opposite sides are equal. 2. Opposite angles are equal. 3. Diagonals not equal and bisect one another. 4. Adjacent angles are supplementary

Rhombus: A parallelogram with sides of equal length.		1. All sides are equal. 2. Opposite angles are equal 3. Diagonals are not equal and perpendicularly bisect one another. 4. Adjacent angles are supplementary
Rectangle: A parallelogram with a right angle		1. Opposite sides are equal 2. All angles are equal(right angle=90^0). 3. Diagonals are equal and bisect one another.
Square: A rectangle with sides of equal length.		1. All sides are equal. 2. Each of the angles is a right angle. 3. Diagonals are equal and perpendicularly bisect one another.
Kite: A quadrilateral with exactly two pairs of equal consecutive sides		1. The diagonals are perpendicular to one another. 2. One of the diagonals bisects the other.

1) A simple closed curve made up of only line segments is called a polygon.
2) A diagonal of a polygon is a line segment connecting two non-consecutive vertices.
3) The number of diagonals in a polygon of n sides is $\frac{n(n-3)}{2}$
4) A convex polygon is a polygon in which no portion of its any diagonal is in its exterior.
5) A quadrilateral is a polygon having only four sides.
6) A regular polygon is a polygon whose all sides are equal and also all angles are equal.
7) The sum of interior angles of a polygon of n sides is (n-2) straight angles=$(n-2)\times180^0$.
8) The sum of interior angles of a quadrilateral is 360°.
9) The sum of exterior angles, taken in an order, of a polygon is 360°.
10) Trapezium is a quadrilateral in which a pair of opposite sides is parallel.
11) Kite is a quadrilateral which has two pairs of equal consecutive sides.
12) A parallelogram is a quadrilateral in which each pair of opposite sides is parallel.
13) In a parallelogram, opposite sides are equal, opposite angles are equal and diagonals bisect each other.
14) A rhombus is a parallelogram in which adjacent sides are equal.
15) In a rhombus diagonals intersect at right angles
16) A rectangle is a parallelogram in which one angle is of 90^0.
17) In a rectangle diagonals are equal.

18) A square is a parallelogram in which adjacent sides are equal and one angle is of 90^0.

19) If diagonals of a quadrilateral bisect at right angles it is a Rhombus (or square).

Focus points:

1. The sum of the interior angles of an n-sided polygon$=(n-2)\times180^0$
2. The sum of all exterior angles of a polygon is 360^0.
3. Each interior angles of an n-sided polygon$=\frac{(n-2)\times180^0}{n}$
4. Each exterior angles of an n-sided polygon$=\frac{360^0}{n}$
5. The number of sides of a regular polygon whose exterior angle $x^0=\frac{360}{x}$