CHAPTER 8

Quadrilaterals

1. OBJECTIVE QUESTIONS

1. The two diagonals are equal in a
(a) parallelogram (b) rhombus
(c) rectangle (d) trapezium

Ans : (c) rectangle

In a rectangle, diagonals are always equal.

2. A quadrilateral has three acute angles each measuring 70°. The measure of fourth angle is
(a) 140° (b) 150°
(c) 105° (d) 120°

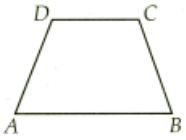
Ans : (b) 150°

Sum of all angles of a quadrilateral $= 360^\circ$
Fourth angle $= 360^\circ - 210^\circ = 150^\circ$

3. A quadrilateral having only one pair of opposite sides parallel is called a
(a) square (b) rhombus
(c) trapezium (d) parallelogram

Ans : (c) trapezium

A quadrilateral having exactly one pair of parallel sides is called a trapezium.
In given figure, $ABCD$ is a trapezium in which $AB \parallel DC$.



4. Two adjacent angles of a parallelogram are $(2x + 25^\circ)$ and $(3x - 5)^\circ$. The value of x is
(a) 28° (b) 32°
(c) 36° (d) 42°

Ans : (b) 32°

Since, adjacent angles of a parallelogram are supplementary.

So, $2x + 25 + 3x - 5 = 180^\circ$
$5x = 160^\circ$
$x = 32^\circ$

5. If in a quadrilateral, two adjacent sides are equal and the opposite sides are unequal, then it is called a
(a) parallelogram (b) square
(c) rectangle (d) kite

Ans : (d) kite

In kite, adjacent sides are equal but opposite sides are not equal.

6. Quadrilateral whose four sides are equal but angles are not equal is
(a) square (b) quadrilateral
(c) rectangle (d) parallelogram

Ans : (b) quadrilateral

7. $ABCD$ is quadrilateral. If AC and BD are its diagonals then the
(a) sum of the squares of the sides of the quadrilateral is equal to the sum of the squares of its diagonals.
(b) perimeter of the quadrilateral is equal to the sum of the diagonals.
(c) perimeter of the quadrilateral is less than the sum of the diagonals.
(d) perimeter of the quadrilateral is greater than the sum of the diagonals.

Ans : (d) perimeter of the quadrilateral is greater than the sum of the diagonals.

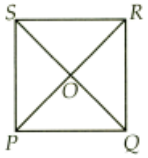
8. Which of the following statements is true?
(a) In a parallelogram, the diagonals are equal
(b) In a parallelogram, the diagonals bisect each other.
(c) In a parallelogram, the diagonals intersect each other at right angles.
(d) In any quadrilateral, if a pair of opposite sides are equal, it is parallelogram.

Ans : (b) In a parallelogram, the diagonals bisect each other.

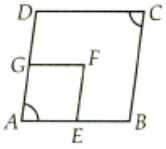
9. $PQRS$ is a square, PR and SQ intersect at O. The measure of $\angle POQ$ is
(a) 45° (b) 90°
(c) 180° (d) None of these

Ans : (b) 90°

Since, the diagonals of a square intersect at right angles, therefore, $\angle POQ = 90^\circ$



10. In the following figure, $ABCD$ and $AEFG$ are two parallelograms. If $\angle C = 55^\circ$, find $\angle F$.



(a) 65° (b) 75°
(c) 85° (d) 55°

Ans : (d) 55°

Given, $ABCD$ is a parallelogram.

$$\angle A = \angle F = 55^\circ$$

11. In a quadrilateral $ABCD$, $\angle A + \angle C = 180^\circ$, then $\angle B + \angle D$ is equal to
(a) 360° (b) 100°
(c) 180° (d) 80°

Ans : (c) 180°

By angle sum property of quadrilateral,
$\angle B + \angle D = 180^\circ$

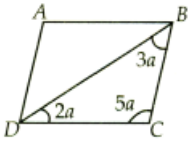
12. The angles of a quadrilateral are x°, $(x-10)^\circ$, $(x+30)^\circ$ and $(2x)^\circ$, the smallest angle is equal to
(a) 68° (b) 52°
(c) 58° (d) 47°

Ans : (c) 58°

Sum of the angles of a quadrilateral is 360°. So,

$$\begin{aligned} x^\circ + (x-10)^\circ + (x+30)^\circ + 2x^\circ &= 360^\circ \\ 5x + 20 &= 360 \\ 5x &= 340 \\ x &= 68 \\ \text{smallest angles is } (x-10)^\circ &= 58^\circ \end{aligned}$$

13. In the given figure, the measure of $\angle C$ is equal to

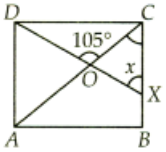


(a) 90° (b) 80°
(c) 75° (d) 95°

Ans : (a) 90°

$$\begin{aligned} 2a + 5a + 3a &= 180^\circ \\ \angle a &= 18^\circ \\ \angle C &= 5a = 5 \times 18^\circ = 90^\circ \end{aligned}$$

14. In the given figure, if $ABCD$ is a square, the value of x is



(a) 45° (b) 60°
(c) 70° (d) 36°

Ans : (b) 60°

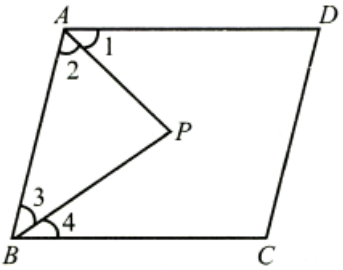
The angles of a square are bisected by the diagonals.

$$\begin{aligned} \angle OCX &= 45^\circ \\ 105^\circ + \angle COX &= 180^\circ \quad \text{[Linear pair]} \\ \angle COX &= 75^\circ \end{aligned}$$

In ΔCOX,

$$\begin{aligned} 45^\circ + 75^\circ + \angle OXC &= 180^\circ \\ \angle OXC &= x = 60^\circ \end{aligned}$$

15. In the given figure, AP and BP are angle bisector of $\angle A$ and $\angle B$ which meets at P on the parallelogram $ABCD$. Then $2\angle APB =$



(a) $\angle C + \angle D$ (b) $\angle A + \angle C$
(c) $\angle B + \angle D$ (d) $2\angle C$

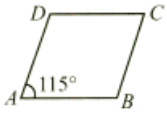
Ans : (a) $\angle C + \angle D$

16. In a parallelogram $ABCD$, $\angle A = 115^\circ$. The measure of $\angle D$ is equal to
(a) 115° (b) 65°
(c) 135° (d) 165°

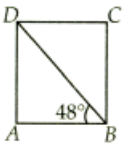
Ans : (b) 65°

Since, $ABCD$ is a parallelogram.
So, $AB \parallel CD$
and AD is a transversal.

$$\begin{aligned} \angle A + \angle D &= 180^\circ \quad \text{[Co-interior angles]} \\ \angle D &= 180^\circ - 115^\circ = 65^\circ \end{aligned}$$



17. In the given figure, $ABCD$ is a square. The measure of $\angle DBC$ is equal to



(a) 48° (b) 38°
(c) 42° (d) 52°

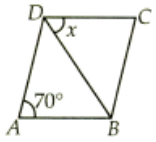
Ans : (c) 42°

$$\angle ABC = 90^\circ$$

[Since, each angle of square is 90°]

$$\begin{aligned} \angle ABD + \angle DBC &= \angle ABC \quad 48^\circ + \angle DBC = 90^\circ \\ \angle DBC &= 90^\circ - 48^\circ = 42^\circ \end{aligned}$$

18. In the given figure, $ABCD$ is a rhombus. If $\angle A = 70^\circ$, then $\angle CDB$ is equal to



(a) 65° (b) 55°
(c) 75° (d) 80°

Ans : (b) 55°

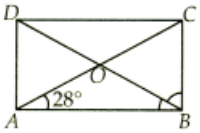
In ΔCDB, we have $CD = CB$
[Since, adjacent sides of rhombus are equal]

$$\angle CBD = \angle CDB = x$$

In $\Delta BCD, \angle BCD = 70^\circ$

$$\angle CDB + \angle CBD + \angle DCB = 180^\circ$$
$$x + x + 70^\circ = 180^\circ$$
$$x = 55^\circ$$
$$\angle CDB = 55^\circ$$

19. In the given figure, $ABCD$ is a rectangle whose diagonals AC and BD intersect at O. If $\angle OAB = 28^\circ$, then $\angle OBC$ is equal to.



(a) 72° (b) 50°
(c) 62° (d) 75°

Ans : (c) 62°

$$OA = OB$$
$$\angle OBA = \angle OAB = 28^\circ$$
$$\angle ABC = 90^\circ$$
$$\angle OBA + \angle OBC = 90^\circ$$
$$28^\circ + \angle OBC = 90^\circ$$
$$\angle OBC = 90^\circ - 28^\circ$$
$$= 62^\circ$$

20. The angles of a quadrilateral are in the ratio 1 : 2 : 3 : 4. The largest angle is

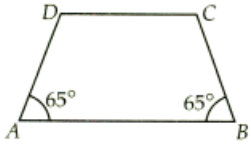
(a) 36° (b) 72°
(c) 108° (d) 144°

Ans : (d) 144°

Let the angles be x, $2x$, $3x$ and $4x$.

$$x + 2x + 3x + 4x = 360^\circ$$
$$10x = 360^\circ$$
$$x = 36^\circ$$
$$\text{largest angle} = 4x = 4 \times 36^\circ = 144^\circ$$

21. In the given figure $AB \parallel CD$, then measure of $\angle C$ is



(a) 65° (b) 115°
(c) 135° (d) 125°

Ans : (b) 115°

$AB \parallel DC$ and $\angle B + \angle C = 180^\circ$

$$\angle C = 180^\circ - 65^\circ = 115^\circ$$

22. $ABCD$ is a rhombus with $\angle ABC = 56^\circ$, then $\angle ACD$ will be

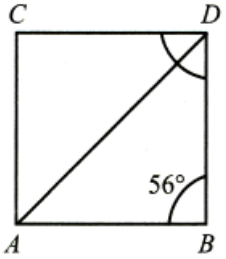
(a) 56° (b) 124°
(c) 62° (d) 34°

Ans : (c) 62°

In rhombus $ABCD$

$$\angle ABC + \angle BCD = 180^\circ$$
$$\angle BCD = 180 - 56 = 124^\circ$$

As, diagonals of a rhombus bisect the angles.



Thus, $\angle ACD = \frac{1}{2} \times BCD$

$$= \frac{1}{2} \times 124 = 62^\circ$$

23. Which is not correct about rectangle $EFGH$?

(a) $\angle E = \angle F = \angle G = \angle H = 90^\circ$
(b) $EG = FH$
(c) $EF = GH$ and $HE = FG$
(d) EG and FH are $\perp$ bisectors

Ans : (d) EG and FH are $\perp$ bisectors

Diagonals of rectangle are not $\perp$ bisectors of each other.

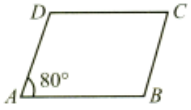
24. In a parallelogram $ABCD$, if $\angle A = 80^\circ$ then $\angle B$ is equal to

(a) 80° (b) 180°
(c) 100° (d) 120°

Ans : (c) 100°

Since, $ABCD$ is a parallelogram.

$$\angle A + \angle B = 180^\circ \quad \text{[co-interior angles]}$$
$$\angle B = 180^\circ - 80^\circ = 100^\circ$$



25. Two adjacent angles of a parallelogram are in the ratio 2 : 3. The angles are

(a) $90^\circ, 180^\circ$ (b) $36^\circ, 144^\circ$
(c) $72^\circ, 108^\circ$ (d) $52^\circ, 104^\circ$

Ans : (c) $72^\circ, 108^\circ$

Let the angles be $2x$ and $3x$.
Adjacent angles of a parallelogram are supplementary.

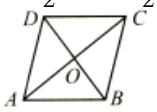
So, $2x+3x = 180^\circ$
$5x = 180^\circ$
$x = 36^\circ$
Hence, One angle is $2x = 72^\circ$
and other is $3x = 108^\circ$

26. In a parallelogram $ABCD$, diagonals AC and BD intersect at O and $AC = 12.8$ cm and $BD = 7.6$ cm. The measure of OC and OD respectively are
(a) 6.4 cm, 3.8 cm (b) 2.4 cm, 3.8 cm
(c) 4.5 cm, 6.4 cm (d) 3.8 cm, 6.4 cm

Ans : (a) 6.4 cm, 3.8 cm

The diagonals of a parallelogram bisect each other.

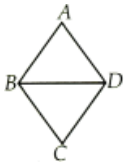
Hence, $OC = \frac{1}{2}AC = \frac{1}{2} \times 12.8\,\text{cm}$
$= 6.4\,\text{cm}$
and $OD = \frac{1}{2}BD = \frac{1}{2} \times 7.6 = 3.8\,\text{cm}$



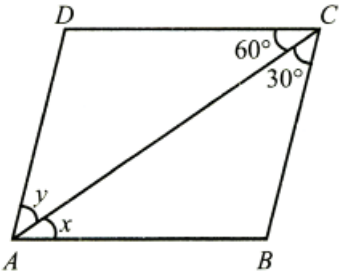
27. One of the diagonals of a rhombus is equal to a side of the rhombus. The pair of unequal angles of the rhombus are
(a) 60°, 80° (b) 60°, 120°
(c) 120°, 240° (d) 100°, 120°

Ans : (b) 60°, 120°

Let, $BD = AB = AD$
Then, ABD is an equilateral triangle in which
$\angle A = 60^\circ$
Also, $\angle C = 60^\circ$
Since, $\angle A + \angle B + \angle C + \angle D = 360^\circ$
Hence, $\angle B = \angle D = 120^\circ$



28. In the figure $ABCD$, the angles x and y are



(a) $60^\circ, 30^\circ$ (b) $30^\circ, 60^\circ$
(c) $45^\circ, 45^\circ$ (d) $90^\circ, 90^\circ$

Ans : (a) $60^\circ, 30^\circ$

$\angle ACD = \angle CAB = x = 60^\circ$ (Alternate angles)
$\angle BCA = \angle CAD = y = 30^\circ$ (Alternate angles)

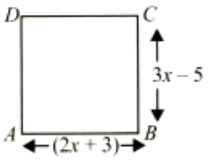
29. $LMNO$ is a trapezium with $LM \parallel NO$. If P and Q are the mid-points of LO and MN respectively and $LM = 5$ cm and $ON = 10$ cm then $PQ =$
(a) 2.5 cm (b) 5 cm
(c) 7.5 cm (d) 15 cm

Ans : (c) 7.5 cm

30. In a square $ABCD$, $AB = (2x+3)$ cm and $BC = (3x-5)$ cm. Then, the value of x is
(a) 5 (b) 7
(c) 8 (d) 10

Ans : (c) 8

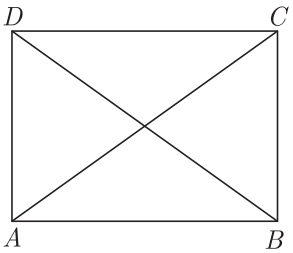
Since, $ABCD$ is a square,
$AB = BC$
$2x+3 = 3x-5$
$x = 8$



31. $ABCD$ is a parallelogram, if the two diagonals are equal, find the measure of $\angle ABC$.
(a) 70° (b) 80°
(c) 90° (d) 100°

Ans : (c) 90°

Since $ABCD$ is a parallelogram. Therefore,
$AB = CD$ and $AD = BC$
[Since, Opposite sides of a parallelogram are equal]



Thus, in Δs ABD and ACB, we have
$AD = BC$ [As proved above]
$BD = AC$ [Given]
and, $AB = AB$ [Common]
So, by SSS criterion of congruence, we have
$\angle BAD = \angle ABC$ [c.p.c.t.] ...(1)
Now, $AD \parallel BC$ and transversal AB intersects them at A and B respectively.
Hence, $\angle BAD + \angle ABC = 180^\circ$
[Sum of the interior angles on the same side of a transversal is 180°]

$$\angle ABC + \angle ABC = 180^\circ \quad \text{[Using (1)]}$$
$$2\angle ABC = 180^\circ$$
$$\angle ABC = 90^\circ$$

Hence, the measure of $\angle ABC$ is 90°.

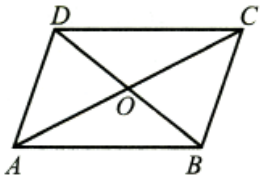
32. In a parallelogram $ABCD$ diagonals AC and BD intersects at O and $AC = 12.8$ cm and $BD = 7.6$ cm, then the measure of OC and OD respectively equal to

(a) 1.9 cm and 6.4 cm (b) 3.8 cm and 3.2 cm

(c) 3.8 cm and 3.8 cm (d) 6.4 cm and 3.8 cm

Ans : (d) 6.4 cm and 3.8 cm

Since, diagonals of a parallelogram bisect each other.



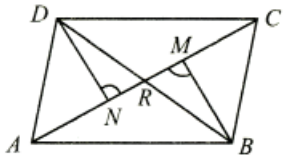
Thus, $OC = \frac{1}{2} \times AC$

$= \frac{1}{2} \times 12.8$

$= 6.4$ cm

$OD = \frac{1}{2} \times BD = \frac{1}{2} \times 7.6 = 3.8$ cm

33. In quadrilateral $ABCD$, BM and DN are drawn perpendiculars to AC such that $BM = DN$. If $BR = 8$ cm, then BD is



(a) 4 cm (b) 2 cm

(c) 12 cm (d) 16 cm

Ans : (d) 16 cm

Consider Δs, DNR and BMR

$DN = BN$ (Given)

$\angle DNR = \angle BMR = 90^\circ$ (Each)

$\angle DRN = \angle BRM$

[Vertically opposite angles]

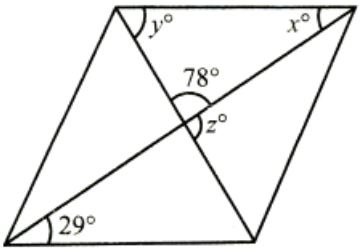
Hence, $\Delta DNR \cong \Delta BMR$

Hence, $DR = BR$

Hence, $BD = 2BR$

Hence, $BD = 2 \times 8 = 16$ cm

34. In the given figure is a parallelogram, find the values of x and y.



(a) $29^\circ, 73^\circ$ (b) $23^\circ, 78^\circ$

(c) $23^\circ, 23^\circ$ (d) $29^\circ, 78^\circ$

Ans : (a) $29^\circ, 73^\circ$

$\angle x = 29^\circ$ [Alternate Angle]

In triangle,

$\angle x + \angle y + 78^\circ = 180^\circ$

$29^\circ + \angle y + 78^\circ = 180^\circ$

$\angle y = 180^\circ - 107^\circ = 73^\circ$

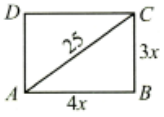
35. The length and breadth of a rectangle are in the ratio 4 : 3. If the diagonal measures 25 cm, then the perimeter of the rectangle is

(a) 58 cm (b) 60 cm

(c) 70 cm (d) 80 cm

Ans : (c) 70 cm

Let, the length and breadth of a rectangle be $4x$ and $3x$.



$(4x)^2 + (3x)^2 = (25)^2$

[By pythagoras theorem]

$16x^2 + 9x^2 = 625$

$x^2 = 25$

$x = 5$

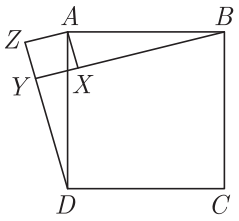
Length of rectangle, $(l) = 4x = 20$ cm

Breadth of rectangle, $(b) = 3x = 15$ cm

Perimeter of a rectangle $= 2(l + b)$

$= 2(35) = 70$ cm

36. In figure X is a point in the interior of square $ABCD \cdot AXYZ$ is also a square. If $DY = 3$ cm and $AZ = 2$ cm, then $BY =$



(a) 5 cm (b) 6 cm

(c) 7 cm (d) 8 cm

Ans : (c) 7 cm

Since quadrilateral $AXYZ$ is a square

Hence, $YZ = AZ = 2$ cm

Now, $DZ = DY + YZ$

$= 3$ cm $+ 2$ cm $= 5$ cm

In right angled ΔAZD,

$AD^2 = AZ^2 + DZ^2$

$= 4\text{ cm}^2 + 25\text{ cm}^2 = 29\text{ cm}^2$

Since, $ABCD$ is a square,

Hence, $AB = AD$

$$AB^2 = AD^2 = 29\text{ cm}^2$$

In right angled ΔBAX,

$$AB^2 = AX^2 + BX^2$$
$$29 = 4 + BX^2$$
$$BX = 5\text{ cm}$$

Since, $AXYZ$ is a square,

Hence, $XY = AZ = 2\text{ cm}$

Now, $BY = BX + XY$

$= 5\text{ cm} + 2\text{ cm} = 7\text{ cm}$

2. FILL IN THE BLANK

DIRECTION : Complete the following statements with an appropriate word/term to be filled in the blank space(s).

1. The diagonals of a rhombus bisect each other at .....
Ans : right angles

2. If in a quadrilateral only one pair of opposite sides are parallel, the quadrilateral is a ..... .
Ans : trapezium

3. If the diagonals of a parallelogram are equal, it is a ..... .
Ans : rhombus

4. If the diagonals of a parallelogram are equal, then it is a ..... .
Ans : rectangle

5. A quadrilateral is a parallelogram if and only if its pair of opposite sides are .....
Ans : equal

6. The figure formed by joining the mid-points of the consecutive sides of a quadrilateral is .....
Ans : parallelogram

7. Sum of the angles of a ..... is 360°.
Ans : quadrilateral

8. The triangle formed by joining the mid-point of the sides of a right triangle is ..... .
Ans : right angle triangle

9. The diagonals of a quadrilateral bisect each other if and only if it is a ..... .
Ans : parallelogram

10. The triangle formed by joining the mid-point of the side of an isosceles triangle is ..... .
Ans : Isosceles

3. TRUE/FALSE

DIRECTION : Read the following statements and write your answer as true or false.

1. Every square is a rectangle.
Ans : True

2. In a parallelogram, the diagonals are equal.
Ans : False

3. If all angles of a quadrilateral are equal, it is a parallelogram.
Ans : True

4. In a parallelogram, the diagonals intersect at right angles.
Ans : False

5. In a parallelogram $ABCD$, sum of angles A and B is 180°.
Ans : True

6. If the diagonals of a quadrilateral divide in into four triangles which are equal in area, then the quadrilateral must be a parallelogram.
Ans : True

7. The figure formed by joining the mid-points of the adjacent sides of a quadrilateral is a parallelogram.
Ans : True

8. The sum of the interior angles of a quadrilateral is 180°.
Ans : False

9. Diagonals necessarily bisect opposite angles in a square.
Ans : True

10. Every rectangle is a parallelogram.
Ans : True

11. We get a rhombus by joining the mid-points of the sides of a rectangle.
Ans : True

4. MATCHING QUESTIONS

DIRECTION : In the section, each question has two matching lists. Choices for the correct combination of elements from Column-I and Column-II are given as options (a), (b), (c) and (d) out of which one is correct.

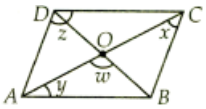
1. Match the following :

Column-I		Column-II	
(P)	Trapezium	(1)	Each angle is 90°
(Q)	Rectangle	(2)	Equal adjacent sides but unequal opposite sides.
(R)	Rhombus	(3)	Unequal sides.
(S)	Kite	(4)	All sides are equal.

	P	Q	R	S
(a)	1	2	3	4
(b)	2	3	4	1
(c)	4	3	2	1
(d)	3	1	4	2

Ans : (d) P–3, Q–1, R–4, S–2

2. By using a given figure of quadrilateral $ABCD$, match Column-I with Column-II.



Column-I		Column-II	
(P)	If $ABCD$ is a parallelogram, then sum of the angles x, y and z is	(1)	25°
(Q)	If $ABCD$ is a rhombus, where $\angle D = 130°$, then the value of x is	(2)	180°
(R)	If $ABCD$ is a rhombus, the value of w is	(3)	50°
(S)	If $ABCD$ is a parallelogram, where $x + y = 130°$, the value of Z is	(4)	90°

	P	Q	R	S
(a)	1	2	3	4
(b)	3	4	2	1
(c)	2	1	4	3
(d)	2	4	3	1

Ans : (c) P–2, Q–1, R–4, S–3

(P) In ΔABC,

$$x + y + \angle ABC = 180°$$

(Angle sum property of a triangle)

$$\angle ABC = 180° - (x + y) \quad ...(1)$$

$$\angle ABC = \angle ADC$$ (Since Opposite angles of a parallelogram are equal)

$$z = 180° - (x + y)$$

[using equation are equal (1)]

$$x + y + z = 180°$$

(Q) $\angle C = 2x$ (Since, Diagonals bisects the angles in rhombus)

Now, we have

$$\angle D + \angle C = 180° \quad \text{(Co-interior angles)}$$

$$130° + 2x = 180° \quad (\angle D = 130°)$$

$$2x = 180° - 130° = 50°$$

$$x = 25°$$

(R) Since, in a rhombus, diagonals bisect each other

$$w = 90°$$

(S) Since in a parallelogram opposite angle are equal

$$\angle B = \angle D = z \quad ...(1)$$

$$z = 180° - (x + y)$$

$$= 180° - 130° = 50°$$

3. Match the following

	Column-I		Column-II
(P)	In a parallelogram $ABCD$, if $\angle D = 115°$, then the measure of $\angle A$ is	(1)	68°
(Q)	$PQRS$ is a square such that PR and SQ intersect at O. The measure of $\angle POQ$ is	(2)	58°
(R)	The diagonals of a rectangle $ABCD$ meet at O. If $\angle BOC = 44°$, then the measure of $\angle OAD$ is	(3)	90°
(S)	If $ABCD$ is a rectangle with $\angle BAC = 32°$, then the measure of $\angle DBC$ is	(4)	65°

Ans : P–4, Q–3, R–1, S–2

(P) $\angle A = 180° - 115° = 65°$

(Q) $\angle POQ = 90°$

(R) $\angle OAD = 68°$

(S) $\angle DBC = 58°$

4. Match the following

	Column-I		Column-II
(P)	Square, rectangle and rhombus are	(1)	quadrilateral
(Q)	Kite and trapezium are	(2)	parallelograms
(R)	All squares are	(3)	not parallelograms
(S)	All parallelograms are	(4)	rectangles

Ans : P–2, Q–3, R–4, S–1

5. ASSERTION AND REASON

DIRECTION : In each of the following questions, a statement of Assertion is given followed by a corresponding statement of Reason just below it. Of the statements, mark the correct

answer as

(a) Assertion and reason are true and reason is the correct explanation of assertion.

(b) Both assertion and reason are true but reason is not the correct explanation of assertion.

(c) Assertion is true but reason is false.

(d) Assertion is false but reason is true.

1. **Assertion :** Two opposite angles of a parallelogram are $(3x-2^\circ)$ and $(50-x)^\circ$. The measure of one of the angle is 37°.
Reason : Opposite angles of a parallelogram are equal.
Ans : (a) Assertion and reason are true and reason is the correct explanation of assertion.

Since, opposite angles of a parallelogram are equal. Therefore,

$$3x-2 = 50-x$$
$$x = 13$$

One angle is 37°

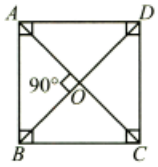
2. **Assertion :** The angles of a quadrilateral are x°, $(x-10)^\circ$, $(x+30)^\circ$ and $(2x)^\circ$, the smallest angle is equal to 58°.
Reason : Sum of the angles of a quadrilateral is 360°.
Ans : (a) Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.

3. **Assertion :** If the diagonals of a parallelogram $ABCD$ are equal, then $\angle ABC = 90^\circ$.
Reason : If the diagonals of a parallelogram are equal, it becomes a rectangle.
Ans : (a) Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.

4. **Assertion :** $ABCD$ is a square. AC and BD intersect at O. The measure of $\angle AOB = 90^\circ$.
Reason : Diagonals of a square bisect each other at right angles.
Ans : (a) Assertion and reason are true and reason is the correct explanation of assertion.

Since, diagonals of a square bisect each other at right angles.

$$\angle AOB = 90^\circ$$



5. **Assertion :** The consecutive sides of a quadrilateral have one common point.
Reason : The opposite sides of a quadrilateral have two common point.
Ans : (c) Assertion is correct but Reason is incorrect.

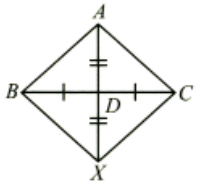
Assertion is correct but Reason is incorrect.

6. **Assertion :** In ΔABC, median AD is produced to X such that $AD = DX$. Then $ABXC$ is a parallelogram.
Reason : Diagonals AX and BC bisect each other at right angles.
Ans : (c) Assertion is true but reason is false.

In quadrilateral $ABXC$, we have

$AD = DX$ [Given]

$BD = DC$ [Given]



So, diagonals AX and BC bisect each other but not at right angles.
Therefore, $ABXC$ is a parallelogram

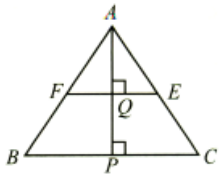
7. **Assertion :** If the angles of a quadrilateral are in the ratio $2:3:7:6$, then the measure of angles are 40°, 60°, 140°, 120° respectively.
Reason : The sum of the angles of a quadrilateral is 360°.
Ans : (a) Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.

8. **Assertion :** A parallelogram consists of two congruent triangles.
Reason : Diagonal of a parallelogram divides it into two congruent triangles.
Ans : (a) Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.

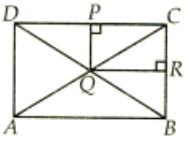
9. **Assertion :** In ΔABC, E and F are the midpoints of AC and AB respectively. The altitude AP at BC intersects FE at Q. Then, $AQ = QP$.
Reason : Q is the midpoint of AP.
Ans : (b) Both assertion and reason are true but reason is not the correct explanation of assertion.

In ΔABC, E and F are midpoint of the sides AC and AB respectively.
$FE \parallel BC$ [By mid-point theorem]
Now, in ΔABP, F is mid-point of AB and $FQ \parallel BP$.
Q is mid-point of AP

$$AQ = QP.$$



10. **Assertion :** $ABCD$ and $PQRC$ are rectangles and Q is a midpoint of AC. Then $DP = PC$.



Reason : The line segment joining the midpoint of any

two sides of a triangle is parallel to the third side and equal to half of it.

Ans : (b) Both assertion and reason are true but reason is not the correct explanation of assertion.

In ΔADC, Q is the midpoint of AC such that $PQ \parallel AD$.

P is the mid-point of DC
$DP = PC$ [Using converse of midpoint theorem]