QB365

Important Questions - Quadrilaterals

9th Standard CBSE

Mathematics

Reg.No. :

Time : 01:00:00 Hrs

Total Marks : 50

Section-A

1) What is the number of vertices of a quadrilateral? **1**

(a) 1 (b) 2 (c) 4 (d) 3

2) If one of a parallelogram is 90^0 and all sides are equal , then it is called a **1**

(a) kite (b) rectangle (c) rhombus (d) square

3) if both the pairs of opposite sides of a quadrilateral are parallel, then the quadrilateral is a **1**

(a) parallelogram (b) trapezium (c) kite (d) rhombus

4) A blackboard is **1**

(a) a parallelogram (b) a rhombus (c) a trapezium (d) kite.

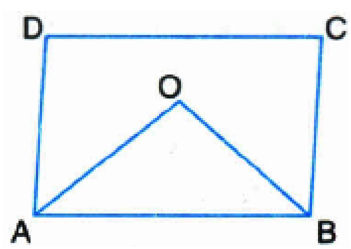
5) ABCD is a rhombus such that $\angle ABC=40^\circ$, then $\angle ADC$ is equal to **1**

(a) 40° (b) 45° (c) 50° (d) 20°

6) In a parallelogram ABCD, if $\angle A=70^\circ$, then the measure of $\angle B$ is **1**

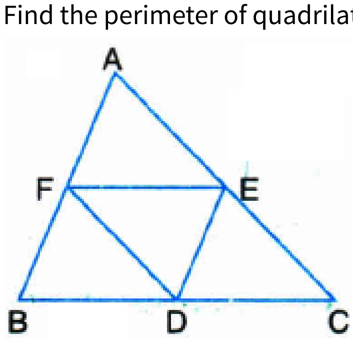
(a) 10° (b) 20° (c) 110° (d) 90°

7) In the following figure, ABCD is a parallelogram. The bisectors of angles A and B intersect at O. Then, the angle AGB is **1**



(a) a right angle (b) an acute angle (c) an obtuse angle (d) a straight angle.a straight angle.

8) Find the perimeter of quadrilateral BDEF. **1**



(a) 8 cm (b) 11 cm (c) 7 cm (d) 3.5 cm

9) The quadrilateral formed by joining the mid-points of the sides of the rhombus taken in order is a **1**

(a) rectangle (b) square (c) trapezium (d) kite

10) The quadrilateral formed by joining the mid-point of the sides of a rectangle taken in order is a **1**

(a) rectangle (b) square (c) rhombus (d) kite

Section-B

11) The angles A, B, C and D of a quadrilateral have measures in the ratio 2 : 4 : 5 : 7. Find the measures of these angles. What type of quadrilateral is it? Give reasons. **2**

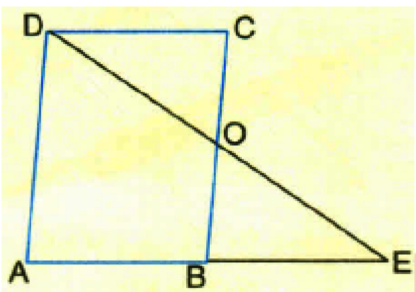
12) In a parallelogram PQRS, if ∠QRS=2x, ∠PQS=4x, and ∠PSQ=4x, find the angles of the parallelogram. **2**

13) If an angle of a parallelogram in two-third of its adjacent angle then find the measure of all the angles, **2**

14) In the figure, ABCD is a parallelogram in which AB is produced to E so that AB = BE **2**

(a) Prove that ED bisects BC

(b) If AD = 10 cm, find OB.



15) if the diagonals of a parallelogram are equal, then show that it is a rectangle. **2**

16) Show that if the diagonals of a quadrilateral bisect each other at right angles, then it is a rhombus. **2**

17) Show that the diagonals of a square are equal and bisect each other at right angles **2**

18) Show that if the diagonals of a quadrilateral are equal and bisect each other at right angles, then it is a square. **2**

19) The angles of a quadrilateral are in the ratio 3 : 5 : 9 : 13. Find all the angles of the quadrilateral. **2**

20) ABCD is a rectangle with $\angle BAC = 42$, Determine $\angle DBC$ **2**

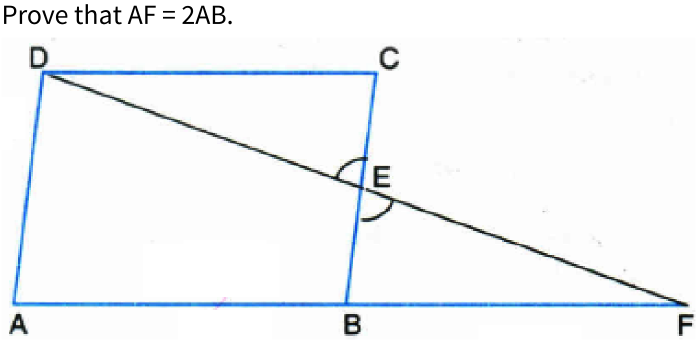
Section-C

21) Prove that each angle of a rectangle is a right angle. **5**

22) "A diagonal of a parallelogram divides it into two congruent triangles:" Prove it. **5**

23) ABCD is a parallelogram and line segments AX, CY bisects the angles A and C respectively. Show that AX II CY. **5**

24) In the figure ABCD is a parallelogram and E is the midpoint of side BC DE and AB on producing meet at F. Prove that AF = 2AB. **5**



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Section-A

1) (c) 4 **1**

2) (b) rectangle **1**

3) (a) parallelogram **1**

4) (a) a parallelogram **1**

5) (a) 40° **1**

6) (c) 110° **1**

7) (a) a right angle **1**

8) (c) 7 cm **1**

9) (a) rectangle **1**

10) (c) rhombus **1**

Section-B

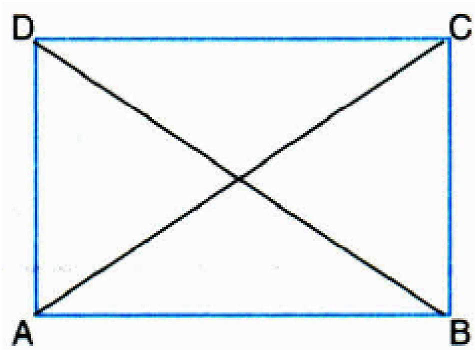
11) 40°, 80°, 100°, 140°; Trapezium **2**

12) $36^\circ, 144^\circ, 36^\circ, 144^\circ$ **2**

13) 72°, 108°, 72°, 108° **2**

14) 5 cm **2**

15) Given: In parallelogram ABCD, AC = BD To Prove: ||gm ABCD is a rectangle. **2**



Proof: In ΔACB and ΔBDA,

AC = BD | Given

AB = BA | Common

BC = AD | Opposite sides of II gm ABCD

$\therefore$ ΔACB =ΔBDA | SSS Congruence Rule

$\therefore$ $\angle ABC = \angle BAD$ $\ldots\ldots(1)$ $C.P.C.T$

AD || BC | Opp. sides of II gm ABCD

and transversal AB intersects them.

$\angle BAD + \angle ABC = 180^\circ$ $\ldots.(2)$

|Sum of consecutive interior angles on the same side of a transversal is 180

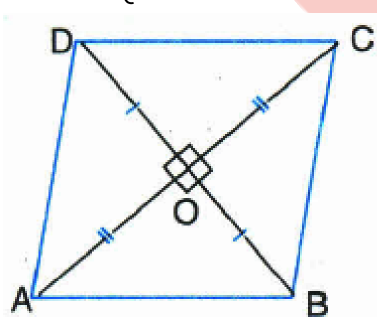
From (1) and (2),

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

$\therefore$ || gm ABCD is a rectangle.

16) Given: ABCD is a quadrilateral whose diagonals AC and BD bisect each other at right angles at O. **2**

To Prove: Quadrilateral ABCD is a rhombus.



proof: In ΔAOB and ΔAOD,

AO = AO |Common

OB = OD | Given

$\angle AOB = \angle AOD$ |Each=90°

$\Delta AOB \cong \Delta AOD$ |SAS Congruence Rule ....(1) | C.P.C.T.

Similarly, we can prove that

AB = BC ....(2)

BC = CD ....(3)

CD = AD ....(4)

In view of (1), (2), (3) and (4) and (4), we obtain

AB = BC = CD = DA

$\therefore$ Quadrilatrral ABCD is a rhombus.

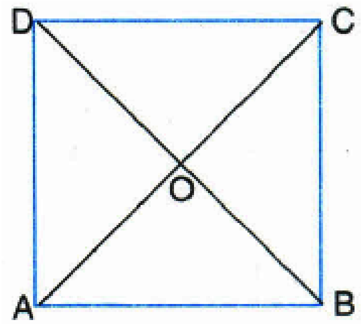
17) Given: ABCD is a square.

To Prove:

(I) AC = BD

(ii) AC and BD bisect each other at right angles.

Proof: (i) In Δ ABC and Δ BAD,



AB=BA I Common

BC=AD I Opp. sides of square ABCD

∠ ABC =∠ BAD |ABCD is a square)

∴ Δ ABC =Δ BAD |SAS Congruence Rule

∴ AC = BD I C.P.C.T.

(ii) In Δ OAD and Δ OCB,

AD = CB I Opp. sides of square ABCD

$\angle OAD = \angle OCB$ | AD || BC and transversal AC intersects them

$\angle ODA = \angle OBC$ | AD || BC and transversal BD intersects them

$\Delta OAD \cong \Delta OCB$ |ASA Congruence Rule

∴ OA = OC ...(1)

Similarly, we can prove that

OB = OD ...(2)

In view of (1) and (2),

AC and BD bisect each other.

Again, in ΔOBA and ΔODA,

OB = OD I From (2) above

BA = DA I Sides of square ABCD

OA = OA I Common

$\Delta OBA \cong \Delta ODA$ |SSS Congruence Rule

$\angle AOB = \angle AOD$

But $\angle AOB + \angle AOD = 180^\circ$ |Linear Pair Axiom

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

∴ AC and BD bisect each other at right angles.

18) 2

Given: The diagonals AC and BD of a quadrilateral ABCD are equal and bisect each other at right angles.

To Prove: Quadrilateral ABCD is a square.

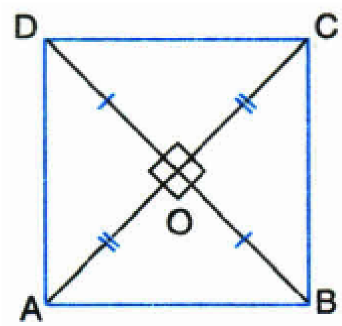
Proof: In ΔOAD and ΔOCB,

OA=OC | Given

OD=OB | Given

$\angle AOD = \angle COB$ |Vertically Opposite Angles

$\therefore \Delta OAD \cong \Delta OCB$ | SAS Congruence Rule



$\therefore$ AD=CB | C.P.C.T.

$\angle ODA = \angle OBC$ |C.P.C.T

$\angle BDA = \angle DBC$

$\therefore$ AD II BC

Now, $\because$ AD = CB and AD II CB

$\therefore$ Quadrilateral ABCD is a II gm. | A quadrilateral is a parallelogram if a pair of opposite sides are parallel and equal.

In $\therefore$ Δ AOB and ΔAOD,

AO = AO | Common

OB = OD | Given

$\angle$AOB = $\angle$AOD |Each=90°

$\therefore$ ΔAOB $\cong$ Δ AOD | SAS Congruence Rule

AB = AD | C.P.C.T.

Now, $\because$ABCD is a parallelogram and

AB=AD

$\because$ ABCD is a rhombus.

Again, in Δ ABC and Δ BAD,

AC = BD | Given

BC = AD | $\because$ ABCD is a rhombus

AB = BA | Common

$\therefore$ Δ ABC $\cong$ Δ BAD | SSS Congruence Rule

$\therefore$ $\angle$ ABC = $\angle$ BAD | C.P.C.T.

$\because$ AD II BC | Opp. sides of IIgm ABCD and transversal AB intersects them.

$\therefore \angle ABC + \angle BAD = 180^\circ$ | Sum of consecutive interior angles on the same side of a transversal is 180°

ABC = $\angle$BAD = 90°

Similarly,$\angle$BCD=$\angle$ADc=90°

$\therefore$ ABCD is a square.

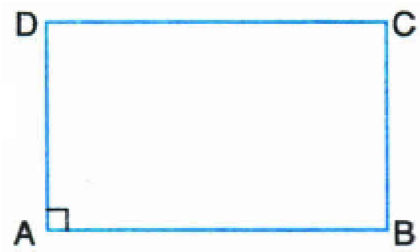
19) 36°, 60°, 108°, 156° **2**

20) 48° **2**

Section-C

21) Given: ABCD is a rectangle with ∠A = 90°. **5**

To Prove: ∠A=∠B=∠C=∠D=90°.



Proof ∴ ABCD is a rectangle

∴ ABCD is a parallelogram

∴ AD II BC I Opposite sides of a parallelogram are parallel and a transversal AB intersects them

∴ ∠A+∠B=180° | Sum of the consecutive interior angles on the same side of a transversal is 180°

⇒ 90° + ∠ B = 180° I∵ ∠A = 90° (given)

⇒ ∠ B = 90°

∵ ABCD is a parallelogram and opposite angles of a parallelogram are equal.

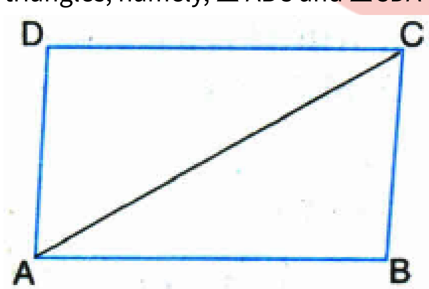
∴ ∠C=∠A=90°

and ∠D=∠B=90°

Hence, ∠A=∠B=∠C=∠D=90°.

22) **5**

Given: ABCD is a parallelogram. AC is a diagonal of parallelogram ABCD which divides it into two triangles, namely, Δ ABC and ΔCDA



To Prove: ΔABC ≅ ΔCDA

Proof: BC IIDA IOpposite sides of a parallelogram are parallel and AC is a transversal

∠ BCA=∠DAC ...(1) I Pair of alternate interior angles

Also, AB IIDC IOpposite sides of a parallelogram are parallel and AC is a transversal

∴ ∠BAC = ∠DCA ......(2) I Alternate interior angles

AC = CA ...(3) I Common

In view of (1), (2) and (3),

Δ ABC ≅ Δ CDA I ASA congruence criterion

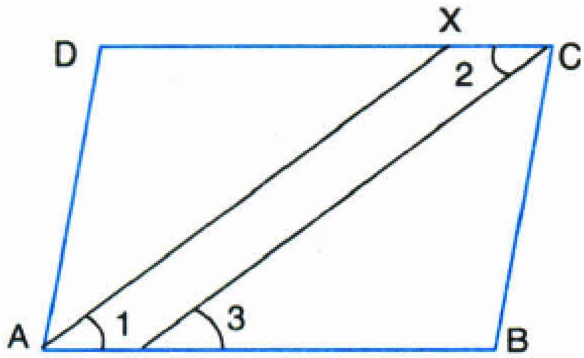
23) **5**

Given: ABCD is a parallelogram and line segments AX, CY bisect the angles A and C respectively.

To Prove: AX IICY.

Proof: ∵ ABCD is a parallelogram.

∴ $\angle A = \angle C$ I Opposite $\angle$s of a parallelogram are equal



⇒ $\frac{1}{2}\angle A = \frac{1}{2}\angle C$ |∵Halves of equals are equal

⇒ $\angle 1 = \angle 2$ ...(1) I ∵ AX is the bisector of $\angle$A and CY is the bisector of $\angle$C Now, AB II DC and CY intersects them

∴ $\angle 2 = \angle 3$ .....(2) I Alternate interior $\angle$ s

From (1) and (2), we get

$\angle 1 = \angle 3$

But these form a pair of equal corresponding angles

∴ AX II CY.

24) Given: ABCD is a parallelogram and E is the mid-point of side BC. DE and AB on producing meet at F. **5**

To Prove: AF = 2AB

Proof: In ΔFAD,

∴ E is the mid-point of BC I Given

and EB II DA | Opposite sides of a parallelogram are parallel

∴ B is the mid-point of AF I By converse of mid-point theorem

AB = BF = $\frac{1}{2}$ AF ⇒ AF = 2AB