Parallelograms Exercise 16B

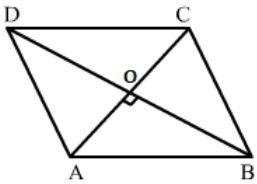
Q1

Answer :

(c) rhombus
In a rhombus, the two diagonals are not necessarily equal.

Q2

(c) 10 cm



Let $ABCD$ be a rhombus.
Let AC and BD be the diagonals of the rhombus intersecting at a point O.
$AC = 16$ cm
$BD = 12$ cm
We know that the diagonals of a rhombus bisect each other at right angles.
$\therefore AO = \frac{1}{2} AC$
$= \left(\frac{1}{2} \times 16\right)$ cm
$= 8$ cm
$BO = \frac{1}{2} BD$
$= \left(\frac{1}{2} \times 12\right)$ cm
$= 6$ cm
From the right ΔAOB :
$AB^2 = AO^2 + BO^2$
$= \left\{(8)^2 + (6)^2\right\}$ cm^2
$= (64 + 36)$ cm^2
$= 100$ cm^2
$\Rightarrow AB = \sqrt{100}$ cm
$= 10$ cm
Hence, the length of the side AB is 10 cm.
Therefore, the length of each side of the rhombus is 10 cm because all the sides of a rhombus are equal.

Q3

Answer :

(b) 32
We know that the sum of adjacent angles of a parallelogram is 180°.
$\Rightarrow 2x + 25 + 3x - 5 = 180$
$\Rightarrow 5x + 20 = 180$
$\Rightarrow 5x = 180 - 20$
$\Rightarrow 5x = 160$
$\Rightarrow x = \frac{160}{5}$
$\Rightarrow x = 32$
Therefore, the value of x is 32.

Q4

Answer :

(a) parallelogram
In a parallelogram, the diagonals do not necessarily intersect at right angles.

Q5

Answer :

(c) 70 cm

Let $ABCD$ be a rectangle and let the diagonal AC be 25 cm, length AB be $4x$ cm and breadth BC be $3x$ cm.
Each angle of a rectangle is a right angle.
$\therefore \angle ABC = 90^\circ$
From the right ΔABC :
$AC^2 = AB^2 + BC^2$
$\Rightarrow (25)^2 = (4x)^2 + (3x)^2$
$\Rightarrow 625 = 16x^2 + 9x^2$
$\Rightarrow 625 = 25x^2$

$x^2 = \frac{625}{25} = 25$
$\Rightarrow x = 5$
$\therefore$ Length $= 4 \times 5 = 20$ cm
Breadth $= 3 \times 5 = 15$ cm

Q6

$\therefore$ Perimeter of the rectangle = 2(20+15) cm
$= 70\ cm$

Answer :

$(d)\ 90^\circ$
The bisectors of any two adjacent angles of a parallelogram intersect at 90°.

Q7

Answer :

$(b)\ 72^\circ$
Let x° be the angle of the parallelogram.
Sum of the adjacent angles of a parallelogram is 180°.
$\therefore x + \left(\frac{2}{3} \times x\right) = 180$
$\Rightarrow x + \frac{2x}{3} = 180$
$\Rightarrow \left(x + \frac{2x}{3}\right) = 180$
$\Rightarrow \frac{5x}{3} = 180$
$\Rightarrow x = \left(180 \times \frac{3}{5}\right)$
$\Rightarrow x = 108$
Hence, one angle of the parallelogram is 108°.
Its adjacent angle $= (180 - 108)^\circ = 72^\circ$
Therefore, the smallest angle of the parallelogram is 72°.

Q8

Answer :

(a) rectangle
In a rectangle, the diagonals do not necessarily bisect the interior angles at the vertices.

Q9

Q10

Answer :

(d) 8
All the sides of a square are equal.
$\therefore AB = BC$
$\Rightarrow 2x + 3 = 3x - 5$
$\Rightarrow 3 + 5 = 3x - 2x$
$\Rightarrow 8 = x$
Therefore, the value of x is 8.

Answer :

$(c)\ 112^\circ$
Let x° be the smallest angle of the parallelogram.
The sum of adjacent angles of a parallelogram is 180°.
$\therefore x + 2x - 24 = 180$
$\Rightarrow 3x - 24 = 180$
$\Rightarrow 3x = 180 + 24$
$\Rightarrow 3x = 204$
$\Rightarrow x = \frac{204}{3}$
$\Rightarrow x = 68$
$\therefore$ Smallest angle $= 68^\circ$
Largest angle $= (180 - 68)^\circ = 112^\circ$