Mensuration
Exercise 20C

Q1

Answer :

Base = 32 cm
Height = 16.5 cm

∴ Area of the parallelogram = Base × Height
= 32 cm × 16.5 cm
= 528 cm^2

Q2

Answer :

Base = 1 m 60 cm = 1.6 m [since 100 cm = 1 m]
Height = 75 cm = 0.75 m

∴ Area of the parallelogram = Base × Height
= 1.6 m × 0.75 m
= 1.2 m^2

Q3

Answer :

(i) Base = 14 dm = (14 × 10) cm = 140 cm [since 1 dm = 10 cm]
Height = 6.5 dm = (6.5 × 10) cm = 65 cm

Area of the parallelogram = Base × Height
= 140 cm × 65 cm
= 9100 cm^2

(ii) Base = 14 dm = (14 × 10) cm [since 1 dm = 10 cm and 100 cm = 1 m]
= 140 cm = 1.4 m
Height = 6.5 dm = (6.5 × 10) cm
= 65 cm = 0.65 m

∴ Area of the parallelogram = Base × Height
= 1.4 m × 0.65 m
= 0.91 m^2

Q4

Answer :

Area of the given parallelogram = 54 cm^2
Base of the given parallelogram = 15 cm
∴ Height of the given parallelogram = $\frac{\text{Area}}{\text{Base}} = \left(\frac{54}{15}\right)$ cm = 3.6 cm

Q5

Answer :

Base of the parallelogram = 18 cm
Area of the parallelogram = 153 cm^2
∴ Area of the parallelogram = Base × Height
⇒ Height = $\frac{\text{Area of the parallelogram}}{\text{Base}} = \left(\frac{153}{18}\right)$ cm = 8.5 cm
Hence, the distance of the given side from its opposite side is 8.5 cm.

Q6

Answer :

Base, AB = 18 cm
Height, AL = 6.4 cm
∴ Area of the parallelogram ABCD = Base × Height
= (18 cm × 6.4 cm) = 115.2 cm^2 ... (i)

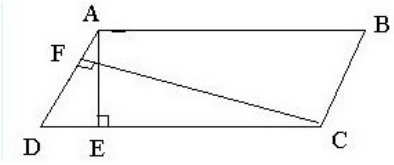
Now, taking BC as the base:
Area of the parallelogram ABCD = Base × Height
= (12 cm × AM) ... (ii)

From equation (i) and (ii):
12 cm × AM = 115.2 cm^2
⇒ AM = $\left(\frac{115.2}{12}\right)$ cm
= 9.6 cm

Q7

Answer :

ABCD is a parallelogram with side *AB* of length 15 cm and the corresponding altitude *AE* of length 4 cm. The adjacent side *AD* is of length 8 cm and the corresponding altitude is *CF*.



Area of a parallelogram = Base × Height

We have two altitudes and two corresponding bases.

$\therefore AD \times CF = AB \times AE$

$\Rightarrow 8 \text{ cm} \times CF = 15 \text{ cm} \times 4 \text{ cm}$

$\Rightarrow CF = \left(\frac{15\times4}{8}\right) \text{ cm} = \left(\frac{15}{2}\right) \text{ cm} = 7.5 \text{ cm}$

Hence, the distance between the shorter sides is 7.5 cm.

Q8

Answer :

Let the base of the parallelogram be x cm.

Then, the height of the parallelogram will be $\frac{1}{3}x$ cm.

It is given that the area of the parallelogram is 108 cm^2.

Area of a parallelogram = Base × Height

$\therefore 108 \text{ cm}^2 = x \times \frac{1}{3}x$

$108 \text{ cm}^2 = \frac{1}{3}x^2$

$\Rightarrow x^2 = (108 \times 3) \text{ cm}^2 = 324 \text{ cm}^2$

$\Rightarrow x^2 = (18 \text{ cm})^2$

$\Rightarrow x = 18 \text{ cm}$

$\therefore$ Base $= x = 18$ cm

Height $= \frac{1}{3}x = \left(\frac{1}{3} \times 18\right)$ cm

$= 6$ cm

Q9

Answer :

Let the height of the parallelogram be x cm.

Then, the base of the parallelogram will be $2x$ cm.

It is given that the area of the parallelogram is 512 cm^2.

Area of a parallelogram = Base × Height

$\therefore 512 \text{ cm}^2 = 2x \times x$

$512 \text{ cm}^2 = 2x^2$

$\Rightarrow x^2 = \left(\frac{512}{2}\right) \text{ cm}^2 = 256 \text{ cm}^2$

$\Rightarrow x^2 = (16 \text{ cm})^2$

$\Rightarrow x = 16 \text{ cm}$

$\therefore$ Base $= 2x = 2 \times 16$

$= 32$ cm

Height $= x = 16$ cm

Q10

Answer :

A rhombus is a special type of a parallelogram.

The area of a parallelogram is given by the product of its base and height.

$\therefore$ Area of the given rhombus = Base × Height

(i) Area of the rhombus = 12 cm × 7.5 cm = 90 cm^2

(ii) Base = 2 dm = (2 × 10) = 20 cm [since 1 dm = 10 cm]

Height = 12.6 cm

$\therefore$ Area of the rhombus = 20 cm × 12.6 cm = 252 cm^2

Q11

Answer :

(i)

Length of one diagonal = 16 cm

Length of the other diagonal = 28 cm

∴ Area of the rhombus = $\frac{1}{2}$ × (Product of the diagonals)

$= \left(\frac{1}{2} \times 16 \times 28\right)$ cm^2 = 224 cm^2

(ii)

Length of one diagonal = 8 dm 5 cm = (8 × 10 + 5) cm = 85 cm [since 1 dm = 10 cm]

Length of the other diagonal = 5 dm 6 cm = (5 × 10 + 6) cm = 56 cm

∴ Area of the rhombus = $\frac{1}{2}$ × (Product of the diagonals)

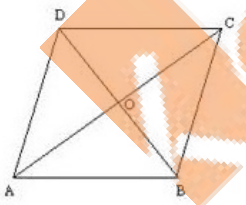
$= \left(\frac{1}{2} \times 85 \times 56\right)$ cm^2

= 2380 cm^2

Q12

Answer :

Let ABCD be the rhombus, whose diagonals intersect at O.



AB = 20 cm and AC = 24 cm

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

Therefore, ΔAOB is a right angled triangle, right angled at O.

Here, OA = $\frac{1}{2}$ **AC** = 12 cm

AB = 20 cm

By Pythagoras theorem:

$(AB)^2 = (OA)^2 + (OB)^2$

$\Rightarrow (20)^2 = (12)^2 + (OB)^2$

$\Rightarrow (OB)^2 = (20)^2 - (12)^2$

$\Rightarrow (OB)^2 = 400 - 144 = 256$

$\Rightarrow (OB)^2 = (16)^2$

⇒ OB = 16 cm

∴ BD = 2 × OB = 2 × 16 cm = 32 cm

∴ Area of the rhombus ABCD = $\left(\frac{1}{2} \times \mathbf{AC} \times \mathbf{BD}\right)$ cm^2

$= \left(\frac{1}{2} \times 24 \times 32\right)$ cm^2

= 384 cm^2

Q13

Answer :

Area of a rhombus = $\frac{1}{2}$ × (Product of the diagonals)

Given:

Length of one diagonal = 19.2 cm

Area of the rhombus = 148.8 cm^2

∴ Length of the other diagonal = $\left(\frac{148.8\times2}{19.2}\right)$ cm = 15.5 cm

Q14

Answer :

Perimeter of the rhombus = 56 cm

Area of the rhombus = 119 cm^2

Side of the rhombus = $\frac{\text{Perimeter}}{4}$ = $\left(\frac{56}{4}\right)$ cm = 14 cm

Area of a rhombus = Base × Height

∴ Height of the rhombus = $\frac{\text{Area}}{\text{Base}}$ = $\left(\frac{119}{14}\right)$ cm

= 8.5 cm

Q15

Answer :

Given:

Height of the rhombus = 17.5 cm

Area of the rhombus = 441 cm^2

We know:

Area of a rhombus = Base × Height

∴ Base of the rhombus = $\frac{\text{Area}}{\text{Height}}$ = $\left(\frac{441}{17.5}\right)$ cm = 25.2 cm

Hence, each side of a rhombus is 25.2 cm.

Q16

Answer :

Area of a triangle = $\frac{1}{2}$ × Base × Height

= $\left(\frac{1}{2}\times24.8\times16.5\right)$ cm^2 = 204.6 cm^2

Given:

Area of the rhombus = Area of the triangle

Area of the rhombus = 204.6 cm^2

Area of the rhombus = $\frac{1}{2}$ × (Product of the diagonals)

Given:

Length of one diagonal = 22 cm

∴ Length of the other diagonal = $\left(\frac{204.6\times2}{22}\right)$ cm

= 18.6 cm