RD SHARMA

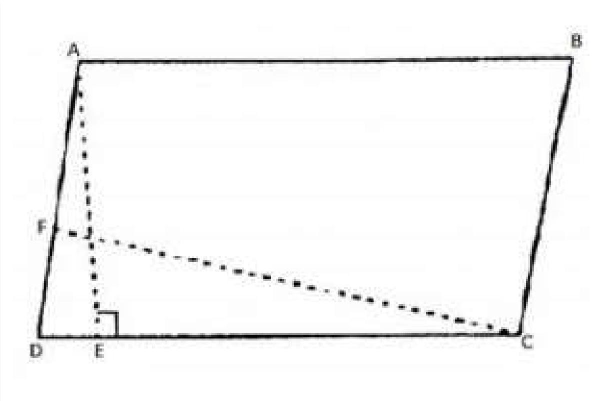
Solutions

Class 9 Maths

Chapter 15

Ex 15.2

Q 1. If figure, ABCD is a parallelogram, AE ⊥ DC and CF ⊥ AD. If AB = 16 cm, AE = 8 cm, and CF = 10 cm, Find AD.



Solution:

Given that,

In parallelogram ABCD, CD = AB = 16 cm
[∵ Opposite side of a parallelogram are equal]

We know that,

Area of parallelogram = Base × Corresponding altitude

Area of parallelogram ABCD = CD × AE = AD × CF

16 cm × cm = AD × 10 cm

AD = $\frac{16\times8}{10}$ cm = 12.8 cm

Thus, The length of AD is 12.8 cm.

Q 2. In Q 1, if AD = 6 cm, CF = 10 cm, and AE = 8 cm, Find AB.

Solution:

We know that,

Area of a parallelogram ABCD = AD × CF $\cdots\cdots\cdots(1)$

Again area of parallelogram ABCD = CD × AE $\cdots\cdots\cdots(2)$

Compare equation(1) and equation(2)

AD × CF = CD × AE

$\Rightarrow 6\times10 = D\times8$

$\Rightarrow D = \frac{60}{8}$ = 7.5 cm

$\therefore AB = DC = 7.5$ cm [∵ Opposite side of a parallelogram are equal]

Q 3. Let ABCD be a parallelogram of area 124 cm^2 . If E and F are the mid-points of sides AB and CD respectively, then find the area of parallelogram AEFD.

Solution:

Given,

Area of a parallelogram ABCD = 124 cm^2

Construction: Draw $AP \perp DC$

Proof:-

Area of a parallelogram AFED = $DF \times AP \cdots\cdots\cdots (1)$

And area of parallelogram EBCF = $FC \times AP \cdots\cdots\cdots (2)$

And $DF = FC \cdots\cdots\cdots (3)$ [F is the midpoint of DC]

Compare equation (1), (2) and (3)

Area of parallelogram AEFD = Area of parallelogram EBCF

$\therefore$ Area of parallelogram AEFD $= \dfrac{\text{Area of parallelogram ABCD}}{2} = \dfrac{124}{2} = 62\ \text{cm}^2$

Q 4. If ABCD is a parallelogram, then prove that

$Ar(\Delta ABD) = Ar(\Delta BCD) = Ar(\Delta ABC) = Ar(\Delta ACD) = \frac{1}{2}Ar(//^{gm} ABCD)$.

Solution:

Given:-

ABCD is a parallelogram,

To prove : $-$ $Ar(\Delta ABD) = Ar(\Delta BCD) = Ar(\Delta ABC) = Ar(\Delta ACD) = \frac{1}{2}Ar(//^{gm} ABCD)$.

Proof:- We know that diagonal of a parallelogram divides it into two equilaterals .

Since, AC is the diagonal.

Then, $Ar(\Delta ABC) = Ar(\Delta ACD) = \frac{1}{2}Ar(//^{gm} ABCD) \cdots\cdots\cdots (1)$

Since, BD is the diagonal.

Then , $Ar(\Delta ABD) = Ar(\Delta BCD) = \frac{1}{2}Ar(//^{gm} ABCD) \cdots\cdots\cdots (2)$

Compare equation (1) and (2)

$\therefore Ar(\Delta ABC) = Ar(\Delta ACD) = Ar(\Delta ABD) = Ar(\Delta BCD) = \frac{1}{2}Ar(//^{gm} ABCD)$