Exercise 18A

Now,

$AM = DC = 10\ cm$

$MB = (AB - AM)$

$= (20 - 10)\ cm$

$= 10\ cm$

Also,

$CM = DA = 13\ cm$

Therefore, $\triangle CMB$ is an isosceles triangle and $CL \perp MB$.

L is the midpoint of B.

$$\Rightarrow ML = LB = \left(\frac{1}{2} \times MB\right)$$

$$= \left(\frac{1}{2} \times 10\right)\ cm$$

$$= 5\ cm$$

From right $\triangle CLM$, we have :

$$CL^2 = \left(CM^2 - ML^2\right)\ cm^2$$

$$\Rightarrow CL^2 = \left\{(13)^2 - (5)^2\right\}\ cm^2$$

$$\Rightarrow CL^2 = (109 - 25)\ cm^2$$

$$\Rightarrow CL^2 = 144\ cm^2$$

$$\Rightarrow CL = \sqrt{144}\ cm$$

$$\Rightarrow CL = 12\ cm$$

$\therefore$ Length of $CL = 12\ cm$

$$\text{Area of the trapezium} = \left\{\frac{1}{2} \times (AB + DC) \times CL\right\}$$

$$= \left\{\frac{1}{2} \times (20 + 10) \times 12\right\}\ cm^2$$

$$= \left(\frac{1}{2} \times 30 \times 12\right)\ cm^2$$

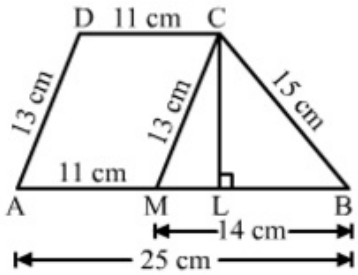
$$= (15 \times 12)\ cm^2$$

$$= 180\ cm^2$$

Hence, the area of the trapezium is $180\ cm^2$.

Q12

Answer :



Let ABCD be the trapezium in which AB $\parallel$ DC, AB $= 25$ cm, CD $= 11$ cm, AD $= 13$ cm and BC $= 15$ cm.
Draw CL $\perp$ AB and CM $\parallel$ DA meeting AB at L and M, respectively.
Clearly, AMCD is a parallelogram.

$$\text{Now,}$$
$$\text{MC} = \text{AD} = 13 \text{ cm}$$
$$\text{AM} = \text{DC} = 11 \text{ cm}$$
$$\Rightarrow \text{MB} = (\text{AB} - \text{AM})$$
$$= (25 - 11) \text{ cm}$$
$$= 14 \text{ cm}$$

$$\text{Thus, in } \triangle \text{CMB, we have :}$$
$$\text{CM} = 13 \text{ cm}$$
$$\text{MB} = 14 \text{ cm}$$
$$\text{BC} = 15 \text{ cm}$$
$$\therefore \text{s} = \frac{1}{2}(13 + 14 + 15) \text{ cm}$$
$$= \frac{1}{2} 42 \text{ cm}$$
$$= 21 \text{ cm}$$
$$(\text{s} - \text{a}) = (21 - 13) \text{ cm}$$
$$= 8 \text{ cm}$$
$$(\text{s} - \text{b}) = (21 - 14) \text{ cm}$$
$$= 7 \text{ cm}$$
$$(\text{s} - \text{c}) = (21 - 15) \text{cm}$$
$$= 6 \text{ cm}$$
$$\therefore \text{ Area of } \triangle \text{CMB} = \sqrt{\text{s}(\text{s} - \text{a})(\text{s} - \text{b})(\text{s} - \text{c})}$$
$$= \sqrt{21 \times 8 \times 7 \times 6} \text{ cm}^2$$
$$= 84 \text{ cm}^2$$

$$\therefore \frac{1}{2} \times \text{MB} \times \text{CL} = 84 \text{ cm}^2$$
$$\Rightarrow \frac{1}{2} \times 14 \times \text{CL} = 84 \text{ cm}^2$$
$$\Rightarrow \text{CL} = \frac{84}{7}$$
$$\Rightarrow \text{CL} = 12 \text{ cm}$$

$$\text{Area of the trapezium} = \left\{\frac{1}{2} \times (\text{AB} + \text{DC}) \times \text{CL}\right\}$$
$$= \left\{\frac{1}{2} \times (25 + 11) \times 12\right\} \text{ cm}^2$$
$$= \left(\frac{1}{2} \times 36 \times 12\right) \text{ cm}^2$$
$$= (18 \times 12) \text{ cm}^2$$
$$= 216 \text{ cm}^2$$

Hence, the area of the trapezium is 216 cm^2.

********** END **********