

Mathematics

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(Chapter – 5) (Introduction to Euclid’s Geometry)(Exemplar Problems)
(Class – IX)

Exercise 5.3

Solve each of the following question using appropriate Euclid’s axiom:

Question 12:

In the Fig.5.12:

- (i) $AB = BC$, M is the mid-point of AB and N is the mid-point of BC. Show that $AM = NC$.
- (ii) $BM = BN$, M is the mid-point of AB and N is the mid-point of BC. Show that $AB = BC$.

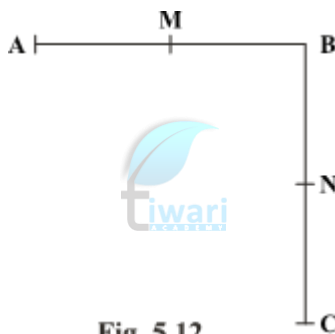


Fig. 5.12

Answer 12:

(i) Given that:

$$AB = BC \quad \dots \text{(i)}$$

M is the mid – point of AB.

$$\therefore AM = MB = \frac{1}{2} AB \quad \dots \text{(ii)}$$

and N is the mid – point of BC

$$\therefore BN = NC = \frac{1}{2} BC \quad \dots \text{(iii)}$$

According to Euclid’s axioms, things which are halves of the same things are equal to one another.

From Equation (i), we get



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$$AB = BC$$

On multiplying both sides by $\frac{1}{2}$, we get

$$\Rightarrow \frac{1}{2} AB = \frac{1}{2} BC$$
$$\Rightarrow AM = NC \quad \text{[using (ii) and (iii)]}$$

(ii) Given that:

$$BM = BN \quad \dots (i)$$

M is the mid –point of AB

$$\therefore AM = BM = \frac{1}{2} AB$$
$$\Rightarrow 2AM = 2BM = AB \quad \dots (ii)$$

and N is the mid – point of BC

$$\therefore BN = NC = \frac{1}{2} BC$$
$$\Rightarrow 2BN = 2NC = 2BC \quad \dots (iii)$$

According to Euclid’s axioms, things which are doubles of the same things are equal to one another.

On multiplying both sides of equation (i) by 2, we get

$$\Rightarrow 2BM = 2BN$$
$$\Rightarrow AB = BC \quad \text{[using (ii) and (iii)]}$$

