EXERCISE 5.3

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

1. Two salesmen make equal sales during the month of August. In September, each salesman doubles his sale of the month of August. Compare their sales in September.

Solution:

Let the sale of both the salesmen in August = x.
According to the question, we have,
In September, each salesman doubles his sales of August.
Hence, we have,
In September,
Sales of first salesmen = 2x
And, sales of second salesman = 2x.
According to Euclid's axioms, things which are double of the same things are equal to one another.
Therefore, in September their sales are again equal.

2. It is known that x + y = 10 and that x = z. Show that z + y = 10?

Solution:

According to the question,
We have,
x+y=10 …(i)
And, x=z …(ii)
Applying the Euclid's axiom,
"if equals are added to equals, the wholes are equal"
We get,
From Eqs. (i) and (ii)
x+y=z+y ….(iii)
From Eqs. (i) and (iii)
z+y=10

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3. Look at the Fig. 5.3. Show that length AH > sum of lengths of AB + BC + CD.

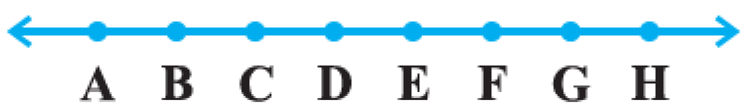

Fig. 5.3

Solution:

According to the given figure, we have,
AB+BC+CD =AD
Here, AD is a part of AH.
According to Euclid's axiom,
"The whole is greater than the part"
i.e., AH > AD
Therefore, length AH > sum of the lengths of AB+BC+CD.

4. In the Fig.5.4, we have AB = BC, BX = BY. Show that AX = CY.

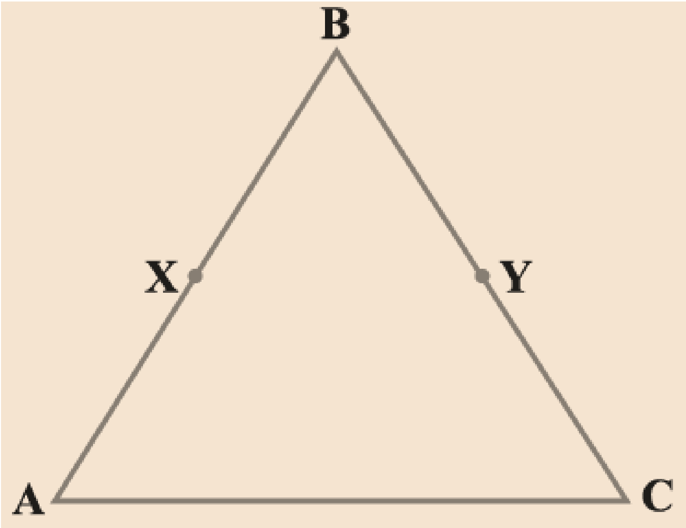

Fig. 5.4

Solution:

According to the question,
We have,
AB =BC …(i)
and BX=BY …(ii)
According to Euclid's axiom,
"If equals are subtracted from equals, the remainders are equal."
Subtracting Eq.(ii) from (i),
We get,
AB-BX = BC-BY
⇒ AX = CY [from the given figure]

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5. In the Fig.5.5, we have X and Y are the mid-points of AC and BC and AX = CY. Show that AC = BC.

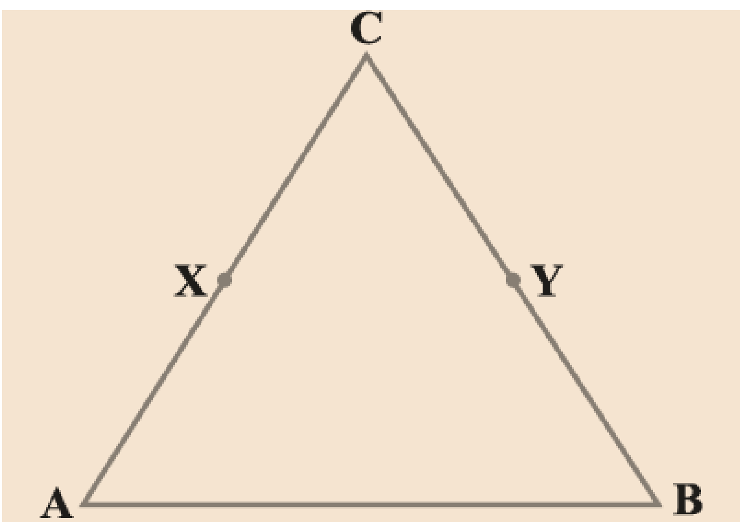

Fig. 5.5

Solution:

Given, X is the mid-point of AC
AX = CX= ½ AC
⇒ 2AX =2CX = AC …(i)
Y is the mid-point of BC.
BY = CY = ½ BC
⇒ 2BY = 2CY= BC …(ii)
According to the question,
We also have,
AX=CY …(iii)
Applying the Euclid's axiom,
"Things which are double of the same things are equal to one another".
We get,
From Eq. (iii),
2AX = 2CY
Using Eqs. (i) and (ii), we get,
AC=BC
Hence Proved.

6. In the Fig.5.6, we have BX = ½ AB, BY = ½ BC and AB = BC. Show that BX = BY.

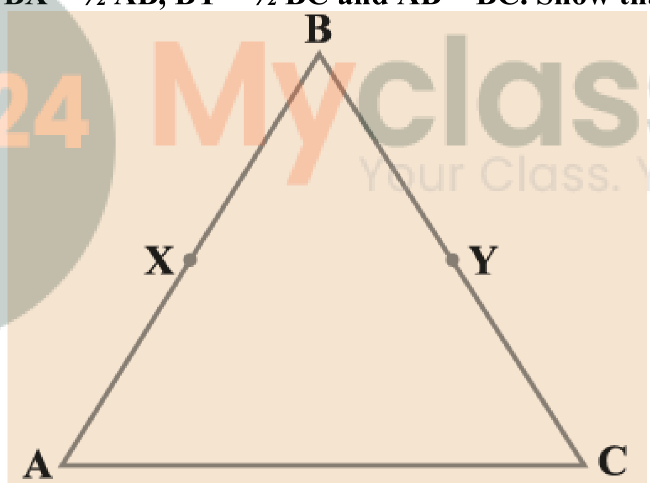

Fig. 5.6

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Solution:

According to the question,
We have,
BX = ½ AB and BY = ½ BC
⇒ 2BX = AB ….(i)
⇒ 2BY = BC ….(ii)
It is also given that,
AB = BC …(iii)
Substituting the values from Eqs. (i) and (ii) in eq. (iii), we get,
2BX = 2BY
Applying the Euclid's axiom, "things which are double of same things are equal to one another".
BX =BY