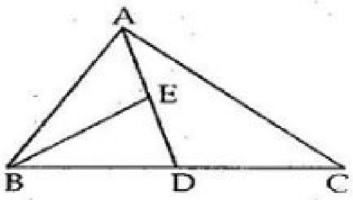
Exercise 10A

Question 17:

Given: A ΔABC in which AD is a median and E is the mid – point of AD



To Prove: $ar(\Delta BED) = \frac{1}{4} ar(\Delta ABC)$

Proof: Since, $ar(\Delta ABD) = ar(\Delta ACD)$ [$\because$ AD is the median]

i.e. $ar(\Delta ABD) = \frac{1}{2} ar(\Delta ABC)$ .....(1)

[$\because ar(\Delta ABC) = ar(\Delta ABD) + ar(\Delta ADC)$]

Now, as BE is the median of ΔABD

$ar(\Delta ABE) = ar(\Delta BED)$ .....(2)

Since $ar(\Delta ABD) = ar(\Delta ABE) + ar(\Delta BED)$ .....(3)

$\therefore$ $ar(\Delta BED) = ar(\Delta ABE)$ [from (2)]

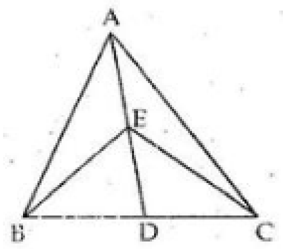
$= \frac{1}{2} ar(\Delta ABD)$ [from (2) and (3)]

$= \frac{1}{2}\left[\frac{1}{2} ar(\Delta ABC)\right]$ [from (1)]

$= \frac{1}{4} ar(\Delta ABC)$

Question 18:

Given: A ΔABC in which E is the mid – point of line segment AD where D is a point on BC.



To Prove: $ar(\Delta BEC) = \frac{1}{2} ar(\Delta ABC)$

Proof: Since BE is the median of ΔABD

So, $ar(\Delta BDE) = ar(\Delta ABE)$

$\therefore$ $ar(\Delta BDE) = \frac{1}{2} ar(\Delta ABD)$ ....(i)

As, CE is median of ΔADC

So, $ar(\Delta CDE) = \frac{1}{2} ar(\Delta ACD)$ ....(ii)

Adding (i) and (ii), we get

$$ar(\Delta BDE) + ar(\Delta CDE) = \frac{1}{2} ar(\Delta ABD) + \frac{1}{2} ar(\Delta ACD)$$

$$ar(\Delta BEC) = \frac{1}{2}\left[ar(\Delta ABD) + ar(\Delta ACD)\right]$$

$$= \frac{1}{2} ar(\Delta ABC).$$

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