Triangles Ex 4.6 Q21

Answer :

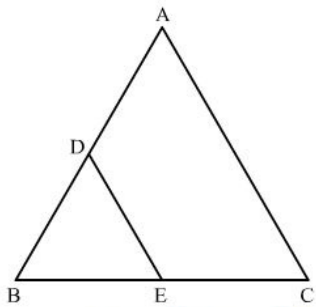
Given: In ΔABC and ΔBDE are equilateral triangles. D is the midpoint of BC.

To find: $\frac{Ar(\Delta\ ABC)}{Ar(\Delta\ BDE)}$

In ΔABC and ΔBDE

$\Delta ABC \sim \Delta BDE$ (AAAcrietria of similarity, all angles of equilateral triangle are equal)

Since D is the midpoint of BC, BD : DC = 1.



We know that the ratio of areas of two similar triangles is equal to the ratio of squares of their corresponding sides.

Let DC = x, and BD = x

Therefore BC = BD + DC = $2x$

Hence

$$\frac{Ar(\Delta ABC)}{Ar(\Delta BDE)} = \frac{BC^2}{BD^2}$$

$$= \frac{(BD+DC)^2}{(BD)^2}$$

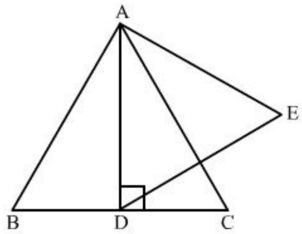
$$= \frac{(1x+1x)^2}{(1x)^2}$$

$$= \frac{(2x)^2}{(1x)^2}$$

$$\boxed{\frac{Ar(\Delta ABC)}{Ar(\Delta BDE)} = \frac{4}{1}}$$

Triangles Ex 4.6 Q22

Answer :



We have an equilateral triangle ΔABC in which AD is altitude. An equilateral triangle ΔADE is drawn using AD as base. We have to prove that, $\frac{ar(\Delta ADE)}{ar(\Delta ABC)} = \frac{3}{4}$

Since the two triangles are equilateral, the two triangles will be similar also.

$\Delta ADE \sim \Delta ABC$

We know that according to the theorem, the ratio of areas of two similar triangles is equal to the ratio of the squares of any two corresponding sides.

$$\frac{ar(\Delta ADE)}{ar(\Delta ABC)} = \left(\frac{AD}{AB}\right)^2 \quad \ldots\ldots (1)$$

Now ΔABC is an equilateral triangle. So,

$\angle B = 60^0$.

Therefore,

$$\sin \angle B = \frac{AD}{AB}$$

So, $\frac{AD}{AB} = \frac{\sqrt{3}}{2}$

We will now use this in equation (1). So,

$$\frac{ar(\Delta ADE)}{ar(\Delta ABC)} = \left(\frac{AD}{AB}\right)^2$$

$$= \left(\frac{\sqrt{3}}{2}\right)^2$$

$$= \boxed{\frac{3}{4}}$$

Hence, proved.

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