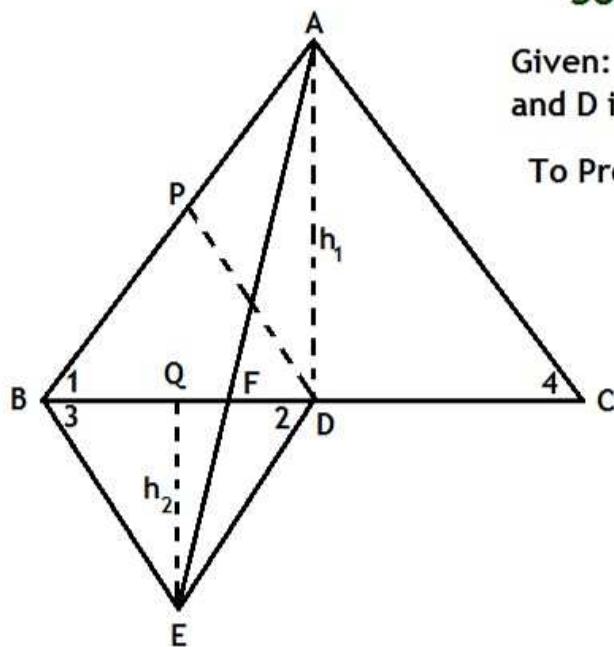


CBSE HOTS IX, Areas of Parallelograms & Triangles 3

Solution by Dev Anoop (Bathinda)



Given: In figure Triangles ABC and BDE are equilateral and D is the midpoint of BC.

To Prove: $\text{ar}(\triangle BDE) = \frac{1}{4} \text{ar}(\triangle ABC)$, $\text{ar}(\triangle ABC) = 2\text{ar}(\triangle BEC)$,
 $\text{ar}(\triangle BDE) = \frac{1}{2}\text{ar}(\triangle BAE)$, $\text{ar}(\triangle BFE) = \text{ar}(\triangle AFD)$,
 $\text{ar}(\triangle BFE) = 2\text{ar}(\triangle FED)$, $\text{ar}(\triangle FED) = \frac{1}{8} \text{ar}(\triangle AFC)$

let $BE = ED = BD = x$ units

$$\begin{aligned}BC &= 2BD \\&= 2x\end{aligned}$$

$$AB = AC = BC = 2x$$

$$\begin{aligned}① \quad \frac{\text{ar}(\triangle BDE)}{\text{ar}(\triangle ABC)} &= \frac{\frac{\sqrt{3}}{4} s_1^2}{\frac{\sqrt{3}}{4} s_2^2} \\&= \frac{x^2}{(2x)^2} \\&= \frac{x^2}{4x^2} \\&= \frac{1}{4}\end{aligned}$$

$$\Rightarrow \text{ar}(\triangle BDE) = \frac{1}{4} \text{ar}(\triangle ABC)$$

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