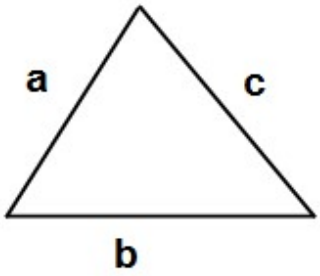
DevAnoop.Me

CBSE HOTS

Herons formula Question 1

If each side of a triangle becomes 4 times, then find ratio of area of new triangle to given triangle.

Solution



$\triangle I$

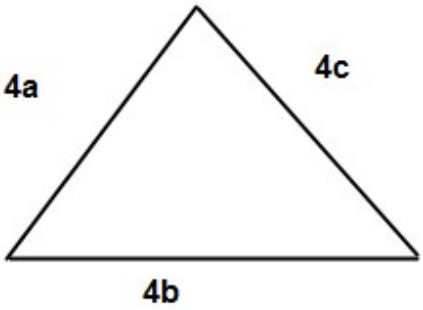
$$s = \frac{a+b+c}{2}$$

$$\Rightarrow 2s = a+b+c \quad \cdots (1)$$

area of $\triangle I$

$$= \sqrt{s(s-a)(s-b)(s-c)}$$

CBSE HOTS



$\triangle$ II

$$s' = \frac{a' + b' + c'}{2}$$

$$= \frac{4(a+b+c)}{2}$$

$$\Rightarrow s' = 2(a+b+c)$$

$$= 2 \times 2s \quad (\text{using } i)$$

$$= 4s$$

$$ar(\Delta II) = \sqrt{s'(s'-a')(s'-b')(s'-c')}$$

$$= \sqrt{4s(4s-4a)(4s-4b)(4s-4c)}$$

$$= \sqrt{4s \times 4(s-a) \times 4(s-b) \times 4(s-c)}$$

$$= 4 \times 4 \sqrt{s(s-a)(s-b)(s-c)}$$

$$= 16 \sqrt{s(s-a)(s-b)(s-c)}$$

$$\Rightarrow ar(\Delta II) = 16\, ar(\Delta I)$$

$$\therefore \frac{ar(\Delta II)}{ar(\Delta I)} = \frac{16}{1}$$

required ratio 16 : 1