

Chapter 12

HERON'S FORMULA

Example-2:

The sides of a $\triangle ABC$ are in the ratio 2 : 4 : 4 and its perimeter is 40 cm. Then, $\text{ar}(\triangle ABC) = K\sqrt{15} \text{ cm}^2$. Find the value of 'K'?

Solution:

Let the sides of $\triangle ABC$ be $2x, 4x, 4x$

$\therefore$ Perimeter of triangle = 40

$$\Rightarrow 2x + 4x + 4x = 40$$

$$\Rightarrow 10x = 40$$

$$\Rightarrow x = 4 \text{ cm}$$

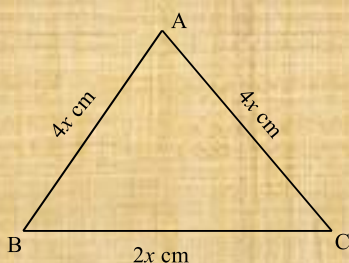
So, the sides are

$$2x = 2(4) = 8 \text{ cm}$$

$$4x = 4(4) = 16 \text{ cm}$$

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$$S = \frac{a+b+c}{2} = \frac{8+16+16}{2} = \frac{40}{2} = 20.$$



$$\begin{aligned} \text{Area of } \triangle ABC &= \sqrt{S(S-a)(S-b)(S-c)} \\ &= \sqrt{20(20-8)(20-16)(20-16)} \\ &= \sqrt{(20)(12)(4)(4)} \\ &= \sqrt{5 \times 4 \times 4 \times 3 \times 4 \times 4} \end{aligned}$$

$$\text{Area of } \triangle ABC = 16\sqrt{15}.$$

But,

$$\text{ar}(\triangle ABC) = K\sqrt{15}$$

$$\Rightarrow 16\sqrt{15} = K\sqrt{15}$$

$$\therefore \boxed{K = 16}$$