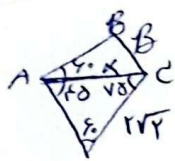


$$\frac{a}{\sin A} = \frac{b}{\sin B} \rightarrow \frac{r}{\sin 120} = \frac{r}{\sin B} \rightarrow \sin B = \frac{\sqrt{3}}{2} \quad B = 60^\circ \quad C = 90^\circ \quad \underline{11}$$



$$\frac{r\sqrt{3}}{\sin 120} = \frac{x}{\sin 90} \quad \frac{r\sqrt{3}}{\frac{1}{2}} = \frac{x}{1} \quad x = r\sqrt{3}$$

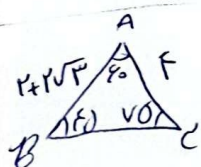
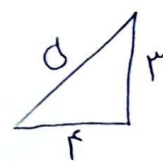
$$B = x \sin 90 = \sqrt{3}r \times \sqrt{3} = r$$

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = k$$

$$k \sin C = \frac{\sin C}{\sin B} \times (b^2 - r^2) \quad k \sin B = b = b^2 - r^2 \rightarrow b^2 - b - r^2 = 0 \quad \text{--- } 1 \times \quad \checkmark$$

$$13^2 = r^2 + r^2 - 2 \times r \times r \times \cos B \quad \cos B = \frac{r}{r} = \frac{1}{2} \quad \checkmark$$

$$\sin B = \frac{r}{r} = \frac{1}{2} \quad \checkmark$$



$$a^2 = 13^2 + r^2(1 + r + r\sqrt{3}) - r \times (r + r\sqrt{3}) \quad a^2 = r^2 \quad a = r\sqrt{3} \quad \checkmark$$

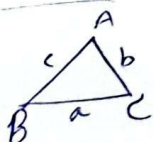
$$\frac{a}{\sin A} = \frac{b}{\sin B} \quad \frac{r}{\sin 120} = \frac{r}{\sin B} \rightarrow \sin B = \frac{\sqrt{3}}{2} \quad B = 60^\circ \quad C = 90^\circ \quad \checkmark$$

$$r = 8 - r \cos \alpha \rightarrow r \cos \alpha = 1 \quad \cos \alpha = \frac{1}{r} \quad \checkmark$$

$$ED^2 = 13^2 + r^2 - r \times 1 \times \frac{1}{r} \quad DE^2 = r^2 \quad DE = r\sqrt{1} \quad \checkmark$$

$$BC^2 = 13^2 + 4^2 - 1 \times 1 \times \frac{1}{r} = 19 \quad BC = \sqrt{19} \quad \checkmark$$

$$\frac{1}{r} \times 8 \times 1 \times \sqrt{3} = \frac{1 \cdot \sqrt{3}}{r} \quad \checkmark$$



$$\frac{(b+c)^2 - a^2}{bc(\cos A + 1)} = \frac{b^2 + rbc + c^2 - b^2 - c^2 + rbc \cos A}{bc(\cos A + 1)} = \frac{rbc(\cos A + 1)}{bc(\cos A + 1)} = r \quad \checkmark$$

$$\frac{a^2 + b^2 - c^2}{a + b - c} = a \quad a^2 + b^2 - c^2 = a^2 + a^2 b - a^2 c \quad (b-c)(b^2 + c^2 + bc) = a^2(b-c) \quad \textcircled{2} - 9$$

$$b^2 + c^2 + bc = b^2 + c^2 - 2bc \cos A \rightarrow bc = -2bc \cos A \quad \cos A = -\frac{1}{2} \rightarrow A = 120^\circ$$

آر میں نوری

② - 10

$$S_{ABC} = \frac{1}{2} \times \frac{1}{2} (1 + \sqrt{3} \cos \theta) (\sqrt{3} - \cos \theta) = 2$$

$$1 - \sqrt{3} - \cos \theta - \sqrt{3} \cos^2 \theta + 4 \cos \theta + \sqrt{3} \cos^2 \theta - 1 \cos \theta + 2 = 0$$

$$\cos^2 \theta - 1 \cos \theta + 1 = 0$$

$$(\cos \theta - \sqrt{3})(\cos \theta - 1) = 0 \rightarrow \begin{cases} \cos \theta = 1 \checkmark \\ \cos \theta = \frac{1}{\sqrt{3}} \times \end{cases}$$

$$a^2 = 14 + 1 - 1\sqrt{3} \rightarrow \boxed{a^2 = 10 - 1\sqrt{3}}$$