

$$\hat{B} + \hat{C} = 120^\circ \rightarrow A = 60^\circ$$

$$\frac{B}{\sin B} = \frac{A}{\sin A} \rightarrow \frac{20\sqrt{4}}{3} = \frac{20}{\sin A} \Rightarrow \sin 60^\circ = \frac{\sqrt{3}}{2} \Rightarrow \sin B = \frac{\sqrt{3}}{2} \Rightarrow \hat{B} = 60^\circ$$

$$\hat{B} + \hat{C} = 60^\circ + \hat{C} = 120^\circ \Rightarrow \hat{C} = 60^\circ \Rightarrow \boxed{B = 60^\circ} \quad \boxed{C = 60^\circ}$$

$$\frac{DC}{\sin A} = \frac{AC}{\sin D} \Rightarrow \frac{2\sqrt{3}}{\frac{\sqrt{3}}{2}} = \frac{AC}{\frac{\sqrt{3}}{2}} \Rightarrow AC = 2\sqrt{3}$$

$$\triangle ABC \rightarrow \sin 60^\circ = \frac{a}{AC} = \frac{a}{2\sqrt{3}} \Rightarrow a = 2\sqrt{3} \times \frac{\sqrt{3}}{2} = 3$$

$$\frac{c}{\sin C} = \frac{b}{\sin B} \Rightarrow \frac{\sin C}{\sin B} = \frac{c}{b} \xrightarrow{\text{مؤن ضرب}} (b^2 - r) \frac{\sin C}{\sin B} = \frac{c}{b} (b^2 - r)$$

$$\Rightarrow \frac{c}{b} + b^2 - r = c \Rightarrow \frac{b^2 - r}{b} = 1 \Rightarrow b^2 - b - r = 0 \Rightarrow \boxed{b = 2} \quad \boxed{b = -1} \quad \text{غځو غځو}$$

$$b^2 = a^2 + c^2 - 2ac \cos B \Rightarrow 144 - 441 + 400 - 2(40) \cos B \Rightarrow \cos B = 0, \wedge$$

$$\Rightarrow \triangle ABC \Rightarrow \sin B = 0,4 \quad \checkmark$$

$$a^2 = 14 + 14 + 2\sqrt{3} - 1 - 1\sqrt{3} = 24 \Rightarrow a = \sqrt{24} = 2\sqrt{6} \quad \text{(ف) (ع)}$$

$$\frac{r}{\sin B} = \frac{r(1+\sqrt{3})}{\sin C} = \frac{2\sqrt{4}}{\frac{\sqrt{3}}{2}} \Rightarrow \sin B = \frac{\sqrt{3}}{2} \Rightarrow \boxed{B = 60^\circ}$$

$$\hat{C} = 120^\circ - (60^\circ + 60^\circ) = 60^\circ$$

$$\triangle ABC \rightarrow BC^2 = AC^2 + AB^2 - 2AC \times AB \times \cos \alpha \Rightarrow f = \omega - f \cos \alpha \quad (4)$$

$$\Rightarrow \cos \alpha = \frac{1}{f} \Rightarrow \triangle ADE \rightarrow DE^2 = 14^2 + 14^2 - 14(14 \cos \alpha) \Rightarrow DE = \sqrt{f_0}$$

$$\Rightarrow \text{ضلع } \triangle ADE = DE = \sqrt{f_0} \quad \checkmark \quad \frac{1}{f} \leftarrow \quad (2)$$

$$BC = a = \sqrt{b^2 + c^2 - 2bc \cos \hat{A}} = \sqrt{4f + 14\omega - 14 \times \frac{1}{f}} = 7 \quad \checkmark \quad \text{افا} \quad (7)$$

$$\Rightarrow BC = 7$$

$$S_{ABC} = \frac{1}{f} \times 14 \times \omega \times \frac{\sqrt{14}}{f} = \frac{14\sqrt{14}}{f^2} \quad \checkmark \quad \text{ب.} \quad (2)$$

$$\rightarrow a^2 = b^2 + c^2 - 2bc \cos A$$

$$\frac{b^2 + c^2 + 2bc - a^2}{bc(\cos A + 1)} = \frac{2bc(1 + \cos A)}{bc(1 + \cos A)} = 2 \quad \checkmark \quad (8)$$

$$a^2 + b^2 + c^2 = a^2 + a^2 b - a^2 c \Rightarrow (b-c)(b^2 + bc + c^2) = a^2(b-c) \quad (9)$$

$$\Rightarrow b^2 + c^2 + bc = a^2 = b^2 + c^2 - 2bc \cos A \quad \text{باتوجه به صورت سوال ضلع ها نابرابرند} \quad (2)$$

$$\Rightarrow bc = -2bc \cos A \Rightarrow \cos A = -\frac{1}{2} \quad \checkmark \quad \text{سینوس الزامی روی ضلع } a \quad \rightarrow A^{\circ} = 120^{\circ}$$

$$S = \frac{1}{f} \times (14 - 14 \cos \theta) \times (1 + \cos \theta) \times \sin 120^{\circ} = 7 \quad (10)$$

$$\Rightarrow -14 \cos^2 \theta + 14 \cos \theta + 14 = 14 \Rightarrow 14 \cos^2 \theta - 14 \cos \theta + 14 = 0$$

$$\Rightarrow \begin{cases} (1) \cos \theta = 1 & \text{G.O.} \\ (2) \cos \theta = \frac{\omega}{14} & \text{G.O.E.} \Rightarrow -1 \leq \cos \theta \leq 1 \end{cases} \quad \text{زیراهوار:} \quad (2)$$

$$\Rightarrow a^2 = b^2 + c^2 - 2bc \cos \hat{A} = f + 14 - 14 \cos 120^{\circ} = 20 - 14 \times \frac{1}{2} \quad \checkmark \quad \frac{\sqrt{14}}{f} \leftarrow$$