

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

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

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

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

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

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

$$\Rightarrow \frac{c}{b} + b^2 - 2 = c \Rightarrow \frac{b^2 - 2}{b} = 1 \Rightarrow b^2 - b - 2 = 0 \quad \begin{cases} b = -1 \text{ غلط} \\ b = 2 \text{ صحیح} \end{cases}$$

$$b^2 = a^2 + c^2 - 2ac \cos B \Rightarrow 144 = 441 + 400 - 2(21 \times 20) \cos B \Rightarrow \cos B = 0.1$$

$$\Rightarrow \sin B = 0.99$$

$$a^2 = 14 + 14 + 14\sqrt{3} - 1 - 1\sqrt{3} = 28 \Rightarrow a = \sqrt{28} = 2\sqrt{7}$$

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

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

$$\triangle ABC \rightarrow BC^2 = AC^2 + AB^2 - 2AC \times AB \times \cos \alpha \Rightarrow f = \omega - f \cos \alpha \quad (6)$$

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

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

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

$$\Rightarrow BC = 7$$

$$S_{ABC} = \frac{1}{f} \times 14 \times \omega \times \frac{\sqrt{14}}{f} = 10\sqrt{14} \quad (\text{ب})$$

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

$$\frac{b^2 + c^2 + 2bc - a^2}{bc(\cos A + 1)} = \frac{2bc(1 + \cos A)}{bc(1 + \cos A)} = 2 \quad (7)$$

$$a^2 + b^2 + c^2 = a^2 + a^2b - a^2c \Rightarrow (b-c)(b^2 + bc + c^2) = a^2(b-c) \quad (8)$$

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

$$\Rightarrow bc = -2bc(\cos A) \Rightarrow \cos A = -\frac{1}{2} \rightarrow \text{سینس الزوے یوب یوب ضلع } a$$

$$S = \frac{1}{f} \times (14 - 14 \cos \theta) \times (1 + \cos \theta) \times \sin 120^\circ = 2 \quad (10)$$

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

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

$$\Rightarrow a^2 = b^2 + c^2 - 2bc \cos \hat{A} = f + 14 - 14 \cos 120^\circ = 20 - 14 \times \frac{1}{2} = 11$$