

۲۱ شوال ۱۴۴۵ سه شنبه

۱۴۰۳/۲/۱۱

اردیبهشت

$$\hat{A} = 11^\circ - 12^\circ = 90^\circ$$

$$\frac{BC}{\sin \hat{A}} = \frac{AC}{\sin \hat{B}}$$

$$\frac{2 \times 2}{\sqrt{2}} = \frac{2 \cdot \sqrt{2}}{2 \sin \hat{B}} = \sin \hat{B} = \frac{2 \cdot \sqrt{2}}{2 \cdot 2} = \frac{\sqrt{2}}{2} \Rightarrow \hat{B} = 45^\circ, \hat{C} = 45^\circ$$

$$\frac{\sqrt{2}}{\sin 45^\circ} = \frac{AC}{\sin 45^\circ} \Rightarrow AC = \sqrt{2} \quad | \quad n = AC \cdot \sin 45^\circ \Rightarrow \sqrt{2} = n$$

$$n = \frac{\sqrt{2}}{2} \times \sqrt{2} = 1$$

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

$$(b^2 - 1) \frac{\sin \hat{C}}{\sin \hat{B}} = c = \frac{c \cdot k \sin \hat{C}}{\sin \hat{B}} \Rightarrow \frac{(b^2 - 1)}{\sin \hat{B}} = k \Rightarrow b^2 - 1 = k \sin \hat{B} = b \Rightarrow$$

$$b^2 - b - 1 = 0 \Rightarrow (b - 1)(b + 1) = 0 \Rightarrow b = 1$$

$$b^2 = a^2 + c^2 - 2ac \cos \hat{B} = 149 = 221 + 200 - 180 \cos \hat{B} \Rightarrow$$

$$\Rightarrow 972 = 180 \cos \hat{B} \Rightarrow \cos \hat{B} = 0.18 \Rightarrow \sin \hat{B} = 1 - (0.18)^2 \Rightarrow 0.94 = \sin \hat{B}$$

$$a^2 = b^2 + c^2 - 2bc \cos \hat{A} = 14 + 14 + 18\sqrt{2} - 18\sqrt{2} = 28 \Rightarrow$$

$$\Rightarrow a = 2\sqrt{7}$$

~~$$a^2 = b^2 + c^2 - 2bc \cos \hat{A} = 14 + 14 + 18\sqrt{2} - 18\sqrt{2} = 28 \Rightarrow a = 2\sqrt{7}$$~~

~~$$a^2 = b^2 + c^2 - 2bc \cos \hat{A} = 14 + 14 + 18\sqrt{2} - 18\sqrt{2} = 28 \Rightarrow a = 2\sqrt{7}$$~~

$$\frac{a}{\sin \hat{A}} = \frac{b}{\sin \hat{B}} = \frac{2\sqrt{7}}{\sqrt{2}} = 2\sqrt{2} = \frac{2}{\sin \hat{B}} \Rightarrow \sin \hat{B} = \frac{\sqrt{2}}{2} \Rightarrow \hat{B} = 45^\circ, \hat{C} = 45^\circ$$

$$\overrightarrow{BC} \cdot \overrightarrow{AC} = \overrightarrow{AD} \cdot \overrightarrow{AE} - \overrightarrow{AB} \cdot \overrightarrow{AC} \cdot \cos \alpha = \varepsilon = \delta - \varepsilon \cos \alpha \Rightarrow \cos \alpha = \frac{1}{3} \quad \text{✓} \quad \text{۶}$$

$$\overrightarrow{ED} = \overrightarrow{AD} + \overrightarrow{AE} - \overrightarrow{AB} \cdot \overrightarrow{AE} \cdot \cos \alpha = \delta \mathbf{i} - \varepsilon \mathbf{j} + \frac{1}{3} \varepsilon \mathbf{j} = \varepsilon \mathbf{j} \quad \text{✓} \quad \text{۷}$$

$$\text{قضیه کوسین: } a^2 = 20 + 9\varepsilon - \varepsilon = 49 \Rightarrow a = 7 \quad \text{✓} \quad \text{۸}$$

$$S = \frac{1}{2} ab \sin C = \frac{1}{2} \times 7 \times \delta \times \frac{\sqrt{3}}{2} = 1 \cdot \sqrt{3} = 8 \quad \text{✓} \quad \text{۹}$$

$$a^2 = b^2 + c^2 - 2bc \cdot \cos \hat{A} \Rightarrow \text{مربع می‌کنیم: } b^2 + c^2 + 2bc - (b^2 + c^2 - 2bc \cdot \cos \hat{A}) \quad \text{۱۰}$$

$$\frac{2bc + 2bc \cdot \cos \hat{A}}{2bc(1 + \cos \hat{A})} = \frac{2bc(1 + \cos \hat{A})}{2bc(1 + \cos \hat{A})} = 1 \quad \text{✓} \quad \text{۱۱}$$

$$\frac{a^2 + b^2 - c^2}{2ab} = \cos \hat{C} \Rightarrow a^2 + b^2 - c^2 = 2ab \cos \hat{C} \Rightarrow a^2 + a^2 b - a^2 c = \dots \quad \text{✓} \quad \text{۱۲}$$

$$\Rightarrow (b-c)(b^2 + bc + c^2) = a^2(b-c) \Rightarrow b^2 + bc + c^2 = a^2 \quad \text{I}$$

$$a^2 = b^2 + c^2 - 2bc \cdot \cos \hat{A} \quad \text{II} \quad \text{I, II} \Rightarrow bc = -2bc \cdot \cos \hat{A} \Rightarrow \cos \hat{A} = -\frac{1}{2} \quad \text{✓} \quad \text{۱۳}$$

$$\Rightarrow \hat{A} = 120^\circ \quad \text{۱۴}$$

$$r = \frac{1}{r} \times \frac{1}{2} \times (1 + r \cos \theta) \Rightarrow r \cos \theta - 1 \cos \theta + \delta = 0 = \dots \quad \text{۱۵}$$

$$(r \cos \theta - \delta)(\cos \theta - 1) = 0 \Rightarrow \cos \theta = 1 \quad \text{۱۶}$$

$$a^2 = b^2 + c^2 - 2bc \cdot \cos \hat{A} = \varepsilon + 14 - 14\sqrt{3} = 2 - 14\sqrt{3} = a^2 \quad \text{✓} \quad \text{۱۷}$$