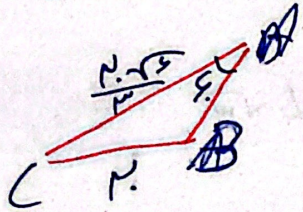


کالیف ۱۳

۲۰ آذین

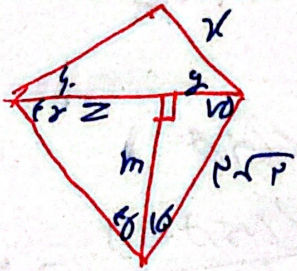
مراد سامع



$$\Rightarrow \frac{b}{\sin B} = \frac{a}{\sin A} \Rightarrow \frac{2\sqrt{3}}{\sin B} = \frac{4}{\sin 60^\circ} = \frac{4}{\frac{\sqrt{3}}{2}} = \frac{8}{\sqrt{3}}$$

(۱)

$$\Rightarrow 4\sqrt{3} = \frac{8}{\sin B} \Rightarrow \sin B = \frac{2}{\sqrt{3}} \Rightarrow B = 48^\circ$$



$$\sin 60^\circ = \frac{\sqrt{3}}{2} \Rightarrow \cos 60^\circ = \frac{1}{2}$$

(۲)

$$\Rightarrow y = \frac{\sqrt{3}-\sqrt{2}}{2} \text{ and } x = \frac{\sqrt{3}+\sqrt{2}}{2}, m = \sqrt{3}$$

(۳)

$$\Rightarrow Z = \sqrt{2} \Rightarrow Z \cdot y = 2\sqrt{3}$$

$$\Rightarrow x = \frac{\sqrt{3}}{2} \text{ and } x\sqrt{3} = 3$$

$$\frac{b}{\sin B} = \frac{c}{\sin C} \Rightarrow \frac{b \sin C}{\sin B} = c \Rightarrow b = \frac{c \sin B}{\sin C} \Rightarrow b = 2$$

(۴)

$$b^2 = c^2 + a^2 - 2ac \cos B \Rightarrow 149 = 44100 - 2 \cdot 210 \cdot 210 \cos B$$

(۵)

$$\Rightarrow 44100 = 44100 - 88200 \cos B \Rightarrow \cos B = \frac{1}{2} \Rightarrow \sin B = \frac{\sqrt{3}}{2}$$

$$a^2 = b^2 + c^2 - 2bc \cos A \Rightarrow 140400 = 140400 - 140400 \cos A$$

(۶)

$$\Rightarrow a^2 = 210^2 \Rightarrow a = 210$$

(۷)

$$\frac{2\sqrt{3}}{2\sqrt{3}} = \frac{2}{\sin B} \Rightarrow \sin B = \frac{1}{2} \Rightarrow B = 30^\circ \Rightarrow C = 90^\circ$$

(۸)

$$BC^2 = 2^2 + 1^2 - 2 \cdot 2 \cdot 1 \cos A \Rightarrow \cos A = \frac{1}{2}$$

(۹)

$$\Rightarrow DE^2 = 2^2 + 1^2 - 2 \cdot 2 \cdot 1 \cos A \Rightarrow DE = \sqrt{3}$$

(۱۰)

$$BC^2 = 4^2 + 3^2 - 2 \cdot 4 \cdot 3 \cdot \frac{1}{2} \Rightarrow BC = \sqrt{7} \quad (\text{الف}) \quad (\checkmark)$$

$$S = \frac{1}{2} \cdot 4 \cdot 3 \cdot \frac{\sqrt{3}}{2} = 3\sqrt{3} \quad (\text{ب}) \quad (\checkmark)$$

$$\frac{1}{2} (4^2 + 3^2 - BC^2) \cdot \frac{1}{2} = 3\sqrt{3} \Rightarrow 4^2 + 3^2 - BC^2 = 12 \Rightarrow BC^2 = 13 \Rightarrow BC = \sqrt{13}$$

$$\Rightarrow \text{Triangle with sides } 4, 3, \sqrt{13} \quad \Rightarrow a^2 = 4^2 + 3^2 - 2 \cdot 4 \cdot 3 \cdot \frac{1}{2} = 7 \Rightarrow a = \sqrt{7}$$

$$a^2 = b^2 + c^2 - 2bc \cos A \Rightarrow 7 = 4^2 + 3^2 - 2 \cdot 4 \cdot 3 \cos A \Rightarrow 7 = 25 - 24 \cos A \Rightarrow 24 \cos A = 18 \Rightarrow \cos A = \frac{3}{4}$$

$$\frac{(b^2 + c^2 - a^2) \cos A}{2bc} = \frac{b^2 + c^2 - a^2}{2bc} \cos A = \frac{b^2 + c^2 - a^2}{2bc} \cdot \frac{3}{4}$$

$$\Rightarrow b^2 + c^2 - a^2 = 2bc \cos A \Rightarrow 4^2 + 3^2 - a^2 = 2 \cdot 4 \cdot 3 \cos A \Rightarrow 25 - a^2 = 24 \cos A$$

$$\Rightarrow b^2 + c^2 - a^2 = 2bc \cos A \Rightarrow 25 - a^2 = 24 \cos A$$

$$\Rightarrow b^2 + c^2 - a^2 = 2bc \cos A \Rightarrow 25 - a^2 = 24 \cos A$$

$$\Rightarrow \cos A = \frac{1}{4}$$