

$$\frac{BC}{\sin A} = \frac{AC}{\sin B} = \frac{BC}{\sin(\hat{B} + \hat{C})} \rightarrow \sin \hat{B} = \frac{BC}{AC} \sin(\hat{B} + \hat{C}) \quad (1)$$

$$\sin \hat{B} = \frac{\sqrt{4}}{3} \left(\frac{\sqrt{3}}{2} \right) = \frac{\sqrt{2}}{2} \rightarrow \hat{B} = 45^\circ, \hat{C} = 45^\circ$$

$$\hat{C} \hat{A} \hat{D} = 45^\circ \rightarrow \frac{CD}{\sin 45^\circ} = \frac{AC}{\sin 45^\circ} \Rightarrow AC = 2\sqrt{2}$$

$$\rightarrow x = AC \sin 45^\circ = 2\sqrt{2} \times \frac{\sqrt{2}}{2} = 2$$

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

$$AC^2 = AB^2 + BC^2 - 2(AB \cdot BC) \cos B$$

$$\rightarrow 169 = 4 + 441 - 2(2 \times 21) \cos B \rightarrow \cos B = 0, 1 \rightarrow \sin B = 0, 1$$

$$a^2 = 4^2 + 4(4 + 2\sqrt{2}) - 2 \times 4 \times 2(1 + \sqrt{2}) \left(\frac{1}{2} \right) = 24 \rightarrow a = 2\sqrt{6}$$

$$\frac{a}{\sin \hat{A}} = \frac{b}{\sin \hat{B}} \rightarrow \sin \hat{B} = \frac{2\sqrt{6}}{4\sqrt{2}} \times \frac{\sqrt{2}}{2} = \frac{\sqrt{2}}{2} \rightarrow \hat{B} = 45^\circ, \hat{C} = 45^\circ$$

$$ABC: 2^2 = 1^2 + 2^2 - 2(1 \times 2) \cos \alpha \rightarrow \cos \alpha = \frac{1}{2}$$

$$ADE \Rightarrow DE^2 = 4^2 + 4^2 - 2(4 \times 4) \left(\frac{1}{2} \right) = 8 \rightarrow DE = 2\sqrt{2}$$

$$BC^2 = a^2 + 1^2 - 2(a \times 1) \left(\frac{1}{2} \right) = 49 \Rightarrow BC = 7$$

$$S = \frac{1}{2} abc \sin \hat{A} = \frac{1}{2} (4 \times 1) \left(\frac{\sqrt{2}}{2} \right) = 1\sqrt{2}$$

رادی معنی

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

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

$$a^2 + b^2 - c^2 = a^2 + a^2 b - a^2 c \rightarrow b^2 - c^2 = a^2(b - c)$$

$$\rightarrow a^2 = b^2 + c^2 + bc = b^2 + c^2 - 2bc \cos \hat{A} \rightarrow \cos \hat{A} = -\frac{1}{2}$$

$$\hat{A} = 120^\circ$$

$$S = \frac{1}{2} bc \sin \hat{A} \Rightarrow 2 \rightarrow bc = \Lambda = (r - \cos \theta)(1 + r \cos \theta)$$

$$= r + \Lambda \cos \theta - r \cos^2 \theta$$

$$\rightarrow -r^2 + \Lambda \epsilon - \Delta = 0 = -(\epsilon - 1)(r\epsilon - \Delta) \rightarrow \epsilon = 1 \rightarrow \cos \theta = 1$$

$$-1 \leq \epsilon = \cos \theta \leq 1$$

$$\epsilon = \frac{a}{r} \times$$

$$\rightarrow c = r, b = r \rightarrow a^2 = b^2 + c^2 - 2bc \left(\frac{\sqrt{3}}{2} \right) = r^2 + r^2 - 2(r \times r) \left(\frac{\sqrt{3}}{2} \right)$$

$$= r^2 - \Lambda \sqrt{3}$$