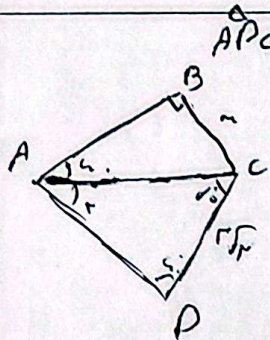


$$\hat{A} + \hat{B} + \hat{C} = 180^\circ \rightarrow A = 60^\circ$$

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

$$\hat{A} + \hat{B} + \hat{C} = 180^\circ \quad \hat{A} = 60^\circ \quad \hat{B} = 45^\circ \rightarrow \hat{C} = 75^\circ$$



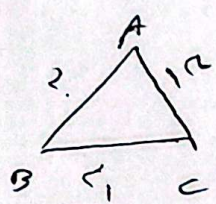
$$\hat{A} + \hat{C} + \hat{D} = 180^\circ \rightarrow \hat{A} = 60^\circ$$

$$\frac{AC}{\sin A} = \frac{BC}{\sin B} \Rightarrow \frac{x}{\sin 60^\circ} = \frac{BC}{\sin 45^\circ} \Rightarrow x = \frac{BC \sin 60^\circ}{\sin 45^\circ}$$

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

$$\frac{c}{\sin C} = \frac{b}{\sin B} \Rightarrow c \sin B = b \sin C \quad (I)$$

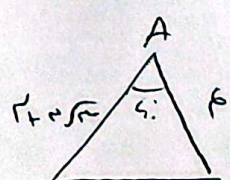
$$\Rightarrow b^2 - b - r = 0 \Rightarrow (b - 1)(b + 1) = 0 \Rightarrow b = 1 \rightarrow \text{چون } b = +1 \checkmark$$



$$b^2 = a^2 + c^2 - 2ac \cos B$$

$$19 = 16 + 16 - 16 \cos B \Rightarrow \cos B = \frac{16 - 19}{-16} = \frac{3}{16}$$

$$\cos B = \frac{3}{16} \Rightarrow \sin B = \frac{\sqrt{16^2 - 3^2}}{16} = \frac{\sqrt{255}}{16}$$



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

$$\rightarrow a^2 = 16 + 16 + 16\sqrt{2} - (16 + 16\sqrt{2} \cos A) =$$

$$a^2 = 16 + 16 + 16\sqrt{2} - 16 - 16\sqrt{2} \cos A = 16 + 16\sqrt{2} (1 - \cos A) = 16 + 16\sqrt{2} \cdot 2 = 16 + 64\sqrt{2} = 80\sqrt{2} \Rightarrow a = \sqrt{80\sqrt{2}} = 4\sqrt{2\sqrt{2}}$$

