

$$B + C = 135^\circ$$

$$180 - 135 = 45^\circ \Rightarrow A$$

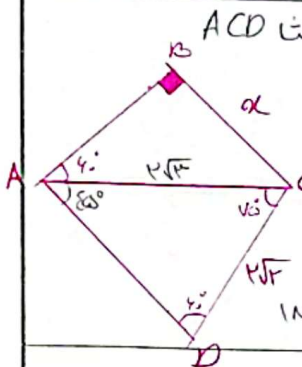
$$\frac{AB}{\sin C} = \frac{AC}{\sin B} \Rightarrow \frac{2}{\sin C} = \frac{2\sqrt{2}}{\sin B}$$

$$\sin B = \frac{2\sqrt{2} \times \frac{1}{\sqrt{2}}}{2} = \frac{\sqrt{2}}{2} \Rightarrow B = 45^\circ$$

$$A + B + C = 180^\circ$$

$$45 + 45 + C = 180^\circ \Rightarrow C = 90^\circ$$

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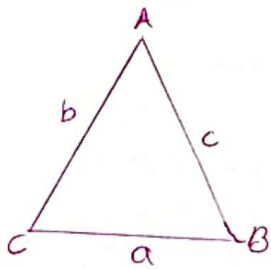
$$\text{ACD (مثلث): } \frac{2\sqrt{2}}{\sin 45^\circ} = \frac{AC}{\sin 45^\circ} \Rightarrow AC = 2\sqrt{2}$$

$$\text{ABC (مثلث): } \frac{AC}{\sin 90^\circ} = \frac{AB}{\sin 45^\circ} \Rightarrow \frac{2\sqrt{2}}{1} = \frac{2}{\frac{1}{\sqrt{2}}} \Rightarrow 2\sqrt{2} \times \frac{\sqrt{2}}{2} = 2$$

$$\boxed{2 = 2}$$

$$180 - 45 - 45 = 90^\circ$$

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

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

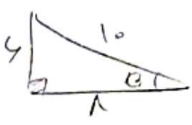
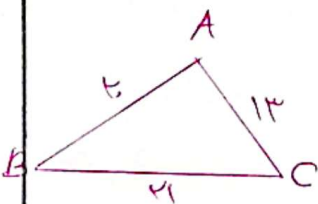
$$\begin{aligned} b^2 - 2 &= b \\ b^2 - b - 2 &= 0 \\ b = -1 \text{ و } 2 \\ \text{و } 2 &\checkmark \\ \text{و } -1 &\times \end{aligned}$$

$$\boxed{b = 2} \text{ جواب}$$

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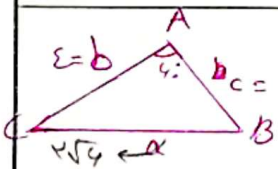
$$\text{طبق قضیه کسینوس ها: } (13)^2 = (2)^2 + (14)^2 - 2(2)(14) \cos B$$

$$169 = 4 + 196 - 56 \cos B \Rightarrow 56 \cos B = 31 \Rightarrow \cos B = \frac{31}{56}$$



$$\boxed{\sin B = \frac{3}{5}}$$

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$$\text{(الف) طبق قضیه کسینوس ها: } a^2 = (2)^2 + (2(1+\sqrt{2}))^2 - 2(2)(2(1+\sqrt{2})) \cos 45^\circ$$

$$a^2 = 4 + 8(1+\sqrt{2}) - 8(1+\sqrt{2}) \times \frac{1}{\sqrt{2}} = 4 + 8 + 8\sqrt{2} - 8 - 8\sqrt{2} = 4$$

$$a^2 = 4 \Rightarrow a = 2$$

$$\boxed{a = 2}$$

$$\frac{2\sqrt{2}}{\sin A} = \frac{2}{\sin B} = \frac{c}{\sin C} \Rightarrow \sin B = \frac{\sqrt{2}}{2} \Rightarrow B = 45^\circ$$

$$A + B + C = 180^\circ \Rightarrow C = 90^\circ$$

(ب) طبق قضیه سینوس ها:

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	طالع شمس و قمر : DE : $DE = 1 + 2 - 2(1)(2)(\cos 60^\circ)$ $\frac{1}{x} = \cos 60^\circ$ ABE (مثلث) : $(DE)^2 = 1^2 + 2^2 - 2(1)(2)(\cos 60^\circ)$ $DE = x \rightarrow \boxed{DE = \sqrt{3}}$	٦
	طبق قوسین : $BC^2 = 2^2 + 4^2 - 2(2)(4)(\cos 60^\circ)$ $BC^2 = 4 + 16 - 8 = 12 \rightarrow BC = \sqrt{12} = 2\sqrt{3}$ $S_{ABC} = \frac{1}{2}(2)(4)(\sin 60^\circ) = \frac{1}{2}(8)(\frac{\sqrt{3}}{2}) = 2\sqrt{3}$	٧
	طبق قوسین : $a^2 = b^2 + c^2 - 2bc \cos A$ $\frac{b^2 + c^2 - a^2}{2bc} = \cos A$ $\frac{b^2 + c^2 - a^2}{2bc} = \frac{1}{2} \rightarrow \boxed{2}$ جواب : $\boxed{2}$	٨
	$a^2 = b^2 + c^2 - 2bc \cos A$ $b^2 + c^2 - a^2 = 2bc \cos A$ $\cos A = \frac{b^2 + c^2 - a^2}{2bc} = \frac{1}{2}$ $\boxed{\cos A = \frac{1}{2}}$	٩
	$\frac{1}{2}(1 - \cos 60^\circ)(1 + \cos 60^\circ) \times \frac{1}{2} = 1 \rightarrow 1 - \cos 60^\circ = 2 \rightarrow \cos 60^\circ = -1$ $\cos 60^\circ = -1$ $a^2 = 1^2 + 2^2 - 2(1)(2)(\cos 60^\circ)$ $a^2 = 1 + 4 - 2(-1) = 7 \rightarrow a = \sqrt{7}$	١٠