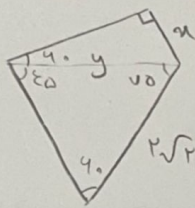


$$\frac{a}{\sin A} = \frac{1/2}{\sin 40^\circ} = \frac{b}{\sin 30^\circ} \Rightarrow \frac{1/2}{\sin 40^\circ} = \frac{1}{\sin 30^\circ} \Rightarrow \frac{1}{2} = \sin \hat{B} \rightarrow \boxed{\hat{B} = 30^\circ}$$



$$\frac{1}{\sin 40^\circ} = \frac{x}{\sin 30^\circ} \Rightarrow x = 2 \sin 30^\circ$$

$$\boxed{x = 1}$$

$$\sin 40^\circ = \frac{x}{2} \Rightarrow x = 2 \sin 40^\circ$$

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

$$(b^2 - 2) \times \frac{1}{b} = c \Rightarrow b = b^2 - 2 \Rightarrow b^2 - b - 2 = 0$$

$$(b-2)(b+1) = 0$$

$$\boxed{b = 2}$$

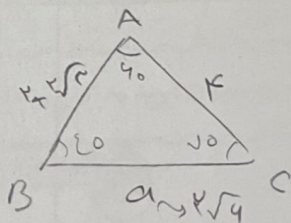
$$149 = \sqrt{E_{00} + E_{01} - 2 \times 20 \times 21 \cos B}$$

$$\begin{array}{r} 149 \\ 4 \sqrt{2} \\ \hline 112 \end{array}$$

$$149 \cos B = 4 \sqrt{2}$$

$$4 \cos B = \frac{4 \sqrt{2}}{10} \Rightarrow \cos B = \frac{\sqrt{2}}{10} \Rightarrow \sin B = 0.19$$

$$\begin{array}{r} 21 \\ 21 \\ \hline 42 \end{array}$$



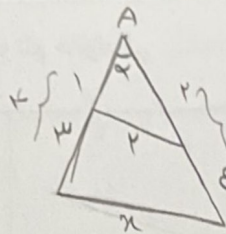
$$a = \sqrt{14 + 2(2 + 2\sqrt{2}) - 2 \times 1(1 + \sqrt{2}) \times \cos 40^\circ}$$

$$14 + 14 + 2\sqrt{2} - 1 - \sqrt{2} \Rightarrow \sqrt{2} = 2\sqrt{2}$$

$$\frac{a}{\sin A} = \frac{2\sqrt{2}}{\sin 40^\circ} = \frac{b}{\sin 30^\circ} \Rightarrow 2\sqrt{2} = \frac{b}{\sin 30^\circ} \Rightarrow \sin 40^\circ = \frac{\sqrt{2}}{2}$$

$$\boxed{\hat{B} = 45^\circ}$$

$$\boxed{\hat{C} = 95^\circ}$$



$$x = \sqrt{1 + \varepsilon - 2 \times 1 \times \varepsilon \cos \alpha}$$

$$x = 1 + \varepsilon - \varepsilon \cos \alpha \rightarrow \cos \alpha = \frac{1}{\varepsilon}$$

$$x^2 = 1 + \varepsilon^2 - 2 \times 1 \times \varepsilon \times \frac{1}{\varepsilon}$$

$$x^2 = \varepsilon \Rightarrow x = \sqrt{\varepsilon} = \boxed{2\sqrt{10}} \text{ - جواب}$$

$$BC^2 = 4\varepsilon + \varepsilon^2 - 2 \times 2 \times \varepsilon \cos \alpha$$

✓ (6)

$$\hookrightarrow \varepsilon \sqrt{4} \rightarrow BC = \sqrt{4}$$

$$S_{\Delta} = \frac{1}{2} \times 2 \times \varepsilon \times \sin \alpha \Rightarrow 20 \times \sqrt{\frac{\varepsilon}{4}} = \boxed{10\sqrt{2}} \text{ - جواب}$$

(ب)

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

$$\hookrightarrow bc(\cos A + 1)$$

$$\frac{2bc(\cos A + 1)}{bc(\cos A + 1)} = \boxed{2} \text{ - جواب}$$

$$a^2 + b^2 - c^2 = a^2 + b^2 - c^2$$

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

$$a^2 = b^2 + c^2 + bc$$

$$-2bc \cos A = bc$$

$$\cos A = -\frac{1}{2}$$

$$\cos \hat{A} = -\frac{1}{2}$$

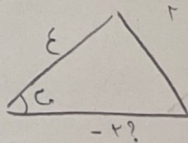
$$\hat{A} = 120^\circ$$

$$S = \frac{1}{2} \times (r - \cos \theta) (1 + r \cos \theta) \times \frac{1}{r} = r \hat{a} = \boxed{20 + 11\sqrt{2}}$$

$$\hookrightarrow \hat{a} = 2 + r \cos \theta - r \cos \theta$$

$$r \cos \theta - r \cos \theta + \hat{a} = 1$$

$$(\cos \theta - 1)(\cos \theta + 1) \Rightarrow \cos \theta = -1$$



$$\hat{a} = \frac{14 + \varepsilon + 2 \times 2 \times \varepsilon \times \sqrt{\frac{\varepsilon}{4}}}{2} = 20 + 11\sqrt{2}$$

1.