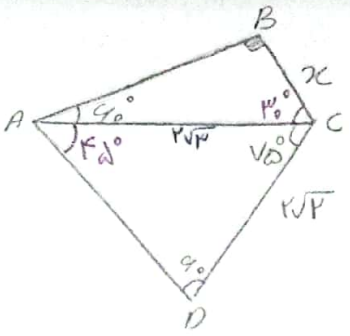

جواب سوال ۲

$$\frac{AC}{\sin 90^\circ} = \frac{2\sqrt{2}}{\sin 45^\circ} \longrightarrow$$

$$\frac{AC}{\frac{\sqrt{2}}{2}} = \frac{2\sqrt{2}}{\frac{\sqrt{2}}{2}} \longrightarrow AC = 2\sqrt{3}$$

$$\longrightarrow \frac{2\sqrt{3}}{\sin 90^\circ} = \frac{x}{\sin 60^\circ} = 2\sqrt{3} = \frac{x}{\frac{\sqrt{3}}{2}} \longrightarrow 2\sqrt{3} = \frac{2x}{\sqrt{3}} \longrightarrow \boxed{x = 3}$$

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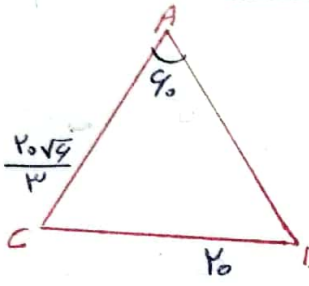
جواب سوال ۱



$$\frac{CB}{\sin A} = \frac{AB}{\sin C} = \frac{AC}{\sin \hat{B}} \longrightarrow$$

$$\frac{20}{\frac{\sqrt{2}}{2}} = \frac{\frac{20\sqrt{6}}{3}}{\sin \beta} \Rightarrow \sin \beta = \frac{\sqrt{2}}{2} \longrightarrow \boxed{\hat{\beta} = 45^\circ}$$

$$\hat{\beta} + \hat{C} = 120^\circ \longrightarrow 45^\circ + \hat{C} = 120^\circ \longrightarrow \boxed{\hat{C} = 75^\circ}$$

جواب سوال ۳

$$\frac{b}{\sin B} = \frac{c}{\sin C} \longrightarrow b \sin C = c \sin \beta \longrightarrow \sin C = \frac{c}{b} \sin \beta$$

$$(b^2 - 2)\frac{\sin C}{\sin \beta} = (b^2 - 2)\frac{\frac{c}{b}\sin\beta}{\sin\beta} = bc - \frac{2c}{b} = c \longrightarrow$$

$$c\left(b - \frac{2}{b}\right) = c \longrightarrow b - \frac{2}{b} = 1 \longrightarrow b^2 - 2 - b = 0 \longrightarrow (b-2)(b+1) = 0$$

$$\boxed{b = 2} \checkmark \longrightarrow \text{جواب}$$

$$b = -1 \times$$

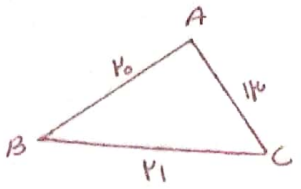
جواب سوال ۸

$$a^2 = b^2 + c^2 - 2bc\cos\hat{A} \longrightarrow \cos\hat{A} = \frac{-b^2 - c^2 + a^2}{-2bc} \text{ یا } \frac{b^2 + c^2 - a^2}{2bc}$$

$$\text{صورت} = bc\left(\frac{b^2 + c^2 - a^2}{2bc} + 1\right) = \frac{b^2 + c^2 - a^2 + 2bc}{2}$$

$$\text{کل کسر} = \frac{b^2 + c^2 + 2bc - a^2}{\frac{b^2 + c^2 + 2bc - a^2}{2}} = \boxed{2} \longrightarrow \text{جواب}$$

جواب سوال ۴



$$۱۳^۲ = (۲۰)^۲ + (۲۱)^۲ - ۲(۲۰)(۲۱)\cos\hat{B}$$

$$۱۶۹ = ۴۰۰ + ۴۴۱ - ۸۴۰\cos\hat{B}$$

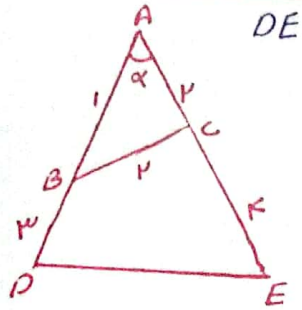
$$۱۶۹ - ۸۴۱ = -۸۴۰\cos B$$

$$-۶۷۲ = -۸۴۰\cos\hat{B} \longrightarrow \cos B = \frac{۶۷۲}{۸۴۰} = \frac{۴}{۵}$$

$$\cos^۲B + \sin^۲B = ۱ \longrightarrow \frac{۱۶}{۲۵} + \sin^۲B = ۱ \longrightarrow \sin^۲B = \frac{۹}{۲۵} \longrightarrow \sin B = \pm\frac{۳}{۵}$$ زاویه حاده

$$\sin\hat{\beta} = \frac{۳}{۵}$$

جواب سوال ۶



$DE = ?$

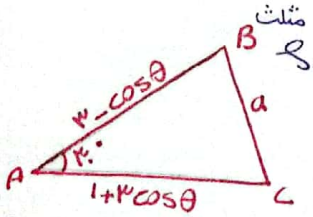
$$BC^۲ = AB^۲ + AC^۲ - ۲(AB)(AC)(\cos\alpha)$$

$$۴ = ۵ - ۴\cos\alpha \longrightarrow -۴\cos\alpha = -۱ \longrightarrow \cos\alpha = \frac{۱}{۴}$$

$$DE^۲ = (۴)^۲ + (۹)^۲ - ۲(۴)(۹)\frac{۱}{۴} = ۵۲ - ۱۲ \Rightarrow DE^۲ = ۴۰$$

$$DE = ۲\sqrt{۱۰}$$

جواب سوال ۱۵



مثلث $S = \frac{۱}{۲}(AB)(AC)\sin ۳۰^\circ = ۲$

$$S = \frac{۱}{۲}(۳-\cos\theta)(۱+۳\cos\theta)\times\frac{۱}{۲} = ۲$$

$$S = \frac{۱}{۴}(-۳\cos^۲\theta + ۸\cos\theta + ۳) = ۲ \longrightarrow -۳\cos^۲\theta + ۸\cos\theta + ۳ = ۸ \Rightarrow$$

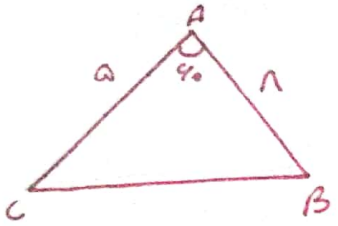
$$(\cos - \frac{۳}{۳})(\cos - ۲) = ۰ \longrightarrow \cos = \frac{۳}{۳}\sqrt{} \quad \cos\theta = ۲\times$$

$$AB = ۳ - \frac{۳}{۳} = \frac{۷}{۳} \qquad AC = ۱ + ۳(\frac{۳}{۳}) = ۳$$

$$a^۲ = ۹ + \frac{۴۹}{۹} - ۱۴(\frac{\sqrt{۳}}{۲}) = \frac{۱۳۰}{۹} - ۷\sqrt{۳} \longrightarrow a = \sqrt{\frac{۱۳۰}{۹} - ۷\sqrt{۳}}$$

$$a^۲ = ۷(\frac{۷۷}{۹} - \sqrt{۳})$$

جواب سوال ۷



الف)

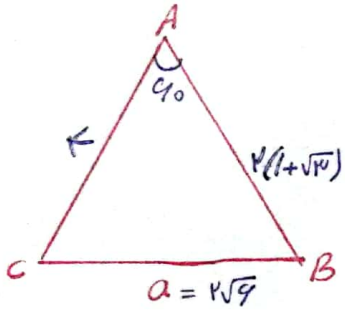
$$BC^2 = AC^2 + AB^2 - 2(AC)(AB)\cos 60^\circ$$

$$BC^2 = 89 - 80\left(\frac{1}{2}\right) \Rightarrow BC^2 = 49 \rightarrow \boxed{BC = 7}$$

ب)

$$S_{ABC} = \frac{1}{2}(AB)(AC)\sin 60^\circ = \frac{1}{2}(5)(8)\left(\frac{\sqrt{3}}{2}\right) = \boxed{10\sqrt{3}}$$

جواب سوال ۹



$$a = \sqrt{b^2 + c^2 - 2bc\cos\hat{A}} = \sqrt{16 + 16 + 8\sqrt{3} - 8 - 8\sqrt{3}}$$

الف)

$$a = \sqrt{24} = 2\sqrt{6}$$

ب)

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

$$\frac{4}{\sin\beta} = \frac{2\sqrt{6}}{\frac{\sqrt{3}}{2}} = \frac{2+2\sqrt{3}}{\sin C} \rightarrow \frac{4}{\sin\beta} = 4\sqrt{2} \rightarrow \sin\beta = \frac{\sqrt{2}}{2} \rightarrow \boxed{\hat{\beta} = 45^\circ}$$

$$\hat{A} + \hat{\beta} + \hat{C} = 180^\circ$$

$$\hat{A} + \hat{\beta} = 105^\circ \longrightarrow \boxed{\hat{C} = 75^\circ}$$