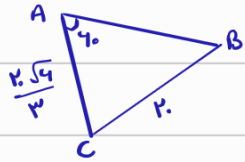


۲. آخرین

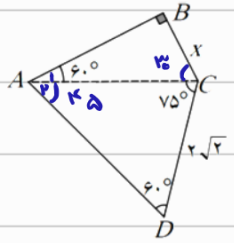


$$B+C=120^\circ \rightarrow \hat{A}=180^\circ-120^\circ=60^\circ$$

$$\Rightarrow \hat{B}=45^\circ \Rightarrow \hat{C}=180^\circ-45^\circ=135^\circ$$

$$\frac{a}{\sin A} = \frac{b}{\sin B} \rightarrow \frac{2}{\frac{\sqrt{2}}{2}} = \frac{2\sqrt{2}}{\sin B} \Rightarrow \sin B = \frac{\sqrt{2}}{2} = \frac{\sqrt{2}}{2}$$

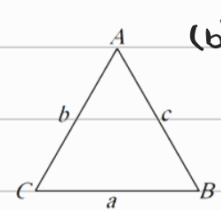
سوال ۱) ۲



$$\frac{a}{\sin A} = \frac{d}{\sin D} \rightarrow \frac{2\sqrt{2}}{\frac{\sqrt{2}}{2}} = \frac{d}{\frac{\sqrt{2}}{2}} \Rightarrow AC = 2\sqrt{2}$$

$$\sin A = \frac{x}{AC} \rightarrow \frac{\sqrt{2}}{2} = \frac{x}{2\sqrt{2}} \rightarrow x = 2$$

سوال ۲) ۲

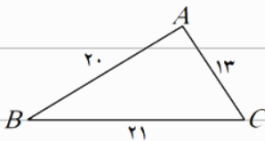


$$(b^2 - 2) \frac{\sin \hat{C}}{\sin \hat{B}} = c \rightarrow \frac{c}{\sin C} = \frac{b}{\sin B} \rightarrow \frac{\sin \hat{C}}{\sin \hat{B}} = \frac{c}{b}$$

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

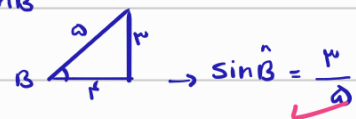
ب = -1 غیر قابل قبول
ب = 2 قابل قبول

سوال ۳) ۲



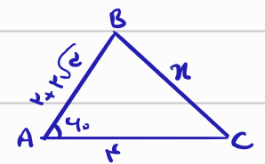
$$b^2 = a^2 + c^2 - 2ac \sin \hat{B} \rightarrow (2)^2 = (1)^2 + (2)^2 - 2(1)(2) \sin \hat{B}$$

$$\rightarrow 4 = 1 + 4 - 4 \sin \hat{B} \rightarrow \cos \hat{B} = \frac{1}{2}$$



سوال ۴)

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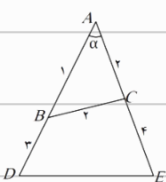


$$a^2 = b^2 + c^2 - 2bc \cos \hat{A} \rightarrow 4 = 4 + 4 + 4 \cos \hat{A} \rightarrow \cos \hat{A} = -\frac{1}{2}$$

$$\rightarrow 4 = 8 + 4 \cos \hat{A} \rightarrow \cos \hat{A} = -\frac{1}{2} \rightarrow \hat{A} = 120^\circ$$

$$\frac{b}{\sin B} = \frac{a}{\sin A} \rightarrow \frac{2}{\sin B} = \frac{2\sqrt{2}}{\frac{\sqrt{3}}{2}} \rightarrow \sin B = \frac{\sqrt{2}}{2} \rightarrow \hat{B} = 45^\circ \rightarrow \hat{C} = 180^\circ - (40^\circ + 45^\circ) = 95^\circ$$

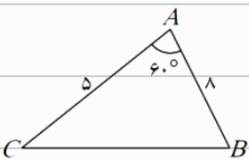
سوال ۵) ۲



$$a^2 = b^2 + c^2 - 2bc \cos \hat{A} \rightarrow 4 = 4 + 4 - 2 \times 2 \times 2 \cos \hat{A} \rightarrow \cos \hat{A} = \frac{1}{2}$$

$$(DE)^2 = (AE)^2 + (AD)^2 - 2(AE)(AD) \cos \hat{A} \rightarrow (DE)^2 = 3^2 + 4^2 - 2 \times 3 \times 4 \times \frac{1}{2} \rightarrow (DE)^2 = 5 \rightarrow DE = \sqrt{5}$$

سوال ۶) ۲



$$a^2 = b^2 + c^2 - 2bc \cos \hat{A} \rightarrow 4 = 2 + 4 - 2 \times 2 \times 2 \times \frac{1}{2} \rightarrow 4 = 4 - 4 \rightarrow 0 = -4$$

$$S = \frac{1}{2} \times b \times c \times \sin \hat{A} \rightarrow \frac{1}{2} \times 2 \times 2 \times \frac{\sqrt{3}}{2} = 1 \times \sqrt{3} = \sqrt{3}$$

سوال ۷) ۲

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

سوال ۸) ۲

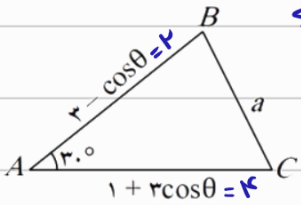
$$\frac{a^2 + b^2 - c^2}{a + b - c} = a^2 \rightarrow a^2 + b^2 - c^2 = a^2 + a^2(b - c) \rightarrow (b - c)(b^2 + c^2 + bc) = a^2(b - c)$$

سوال ۹

چون فرض سوال $b \neq c$ است پس $\rightarrow b^2 + c^2 + bc = a^2 \rightarrow b^2 + c^2 + bc = b^2 + c^2 - 2bc \cos \hat{A}$

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$b - c \neq 0$ است پس می توان از دو طرفنا حذف کرد $\rightarrow \cos \hat{A} = \frac{bc}{-2bc} = \frac{-1}{2} \rightarrow \hat{A} = 120^\circ$



$$S_{\triangle ABC} = 2 = \frac{1}{2} \times b \times c \times \sin \hat{A} \rightarrow \frac{1}{2} \times (2 - \cos \theta) \times (1 + r \cos \theta) \times \frac{1}{2} = 2$$

سوال ۱۰

$$\rightarrow -r \cos^2 \theta + 1 \cos \theta + r = 4 \rightarrow -r \cos^2 \theta + 1 \cos \theta - 3 = 0 \rightarrow \cos \theta = 1 \vee \cos \theta = \frac{2}{r}$$

$$a^2 = b^2 + c^2 - 2bc \cos \hat{A} \rightarrow a^2 = 14 + 4 - 14 \frac{\sqrt{3}}{2} \rightarrow a^2 = 20 - 7\sqrt{3} \rightarrow a = \sqrt{20 - 7\sqrt{3}}$$

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