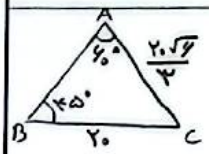
نام و نام خانوادگی ..... پاسخنامه تشریحی تکلیف شماره ...۱۳.. کلاس .دوازدهم ریاضی A.....

۱



$$\frac{AC}{\sin\hat{B}}=\frac{BC}{\sin\hat{A}} \rightarrow \frac{\frac{20\sqrt{6}}{3}}{\sin\hat{B}}=\frac{20}{\frac{\sqrt{3}}{2}} \rightarrow \sin\hat{B}=\frac{\sqrt{2}}{2} \rightarrow \boxed{B=45^\circ}$$

$$\boxed{C=75^\circ}$$

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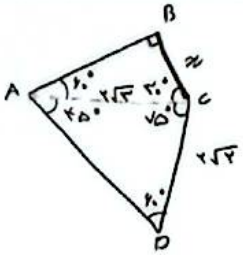

$$\frac{DC}{\sin\hat{A}}=\frac{AC}{\sin\hat{D}} \rightarrow \frac{2\sqrt{2}}{\frac{\sqrt{2}}{2}}=\frac{AC}{\frac{\sqrt{3}}{2}} \rightarrow AC=2\sqrt{3}$$

$$\frac{AC}{\sin\hat{B}}=\frac{BC}{\sin\hat{A}} \rightarrow \frac{2\sqrt{3}}{1}=\frac{x}{\frac{\sqrt{3}}{2}} \rightarrow \boxed{x=3}$$

۳

$$\frac{b}{\sin\hat{B}}=\frac{c}{\sin\hat{C}} \rightarrow b\frac{\sin\hat{C}}{\sin\hat{B}}=c$$

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

$$b^2-b-2=0 \rightarrow \begin{cases} \boxed{b=2}\ \checkmark \\ b=-1 \text{ قق} \end{cases}$$

۴

$$AC^2=AB^2+BC^2-2AB\,BC\cos\hat{B}$$

$$149=400+441-2(20)(21)\cos\hat{B}$$

$$\cos\hat{B}=\frac{4}{5} \rightarrow \boxed{\sin\hat{B}=\frac{3}{5}}$$

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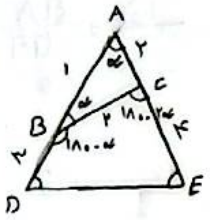
الف)

$$a=\sqrt{16+16+8\sqrt{3}-2\times4\times2(1+\sqrt{3})\times\frac{1}{2}}=\sqrt{24}=2\sqrt{6}$$

ب)

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

$$\frac{2\sqrt{6}}{\frac{\sqrt{3}}{2}}=\frac{4}{\sin\hat{B}}=\frac{2(1+\sqrt{3})}{\sin\hat{C}} \rightarrow \sin\hat{B}=\frac{\sqrt{2}}{2} \rightarrow \boxed{\hat{B}=45^\circ} \quad \boxed{\hat{C}=75^\circ}$$



$BC = \sqrt{AC^2 + AB^2 - 2\,AC\,AB\cos\hat{A}}$

$2 = \sqrt{5 - 4\cos\alpha} \longrightarrow \cos\alpha = \frac{1}{4}$

$DE = \sqrt{AD^2 + AE^2 - 2\,AD\,AE\cos\hat{A}} = \sqrt{14 + 32 - 2(4)(4)\left(\frac{1}{4}\right)} = \sqrt{40} = \boxed{2\sqrt{10}}$ ۶

الف) $BC = \sqrt{AB^2 + AC^2 - 2\,AB\,AC\cos A} = \sqrt{64 + 25 - 2\times 8\times 5\times\frac{1}{2}} = \boxed{7}$

ب) $S_{ABC} = \frac{1}{2}\times 8\times 5\times\frac{\sqrt{3}}{2} = \boxed{10\sqrt{3}}$ ۷

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

$\frac{b^2 + c^2 + 2bc - b^2 - c^2 + 2bc\cos\hat{A}}{bc(\cos\hat{A} + 1)} = \frac{2bc + 2bc\cos\hat{A}}{bc(\cos\hat{A} + 1)} = \frac{2bc(\cos\hat{A} + 1)}{bc(\cos\hat{A} + 1)} = \boxed{2}$ ۸

$a^3 + b^3 - c^3 = a^2 + ba^2 - ca^2 \longrightarrow b^3 - c^3 = a^2(b - c) \longrightarrow b^2 + c^2 + bc = a^2 \longrightarrow$

$b^2 + c^2 + bc = b^2 + c^2 - 2bc\cos\hat{A} \longrightarrow \boxed{-\frac{1}{2} = \cos\hat{A}}$ ۹

$a^2 = (3 - \cos\theta)^2 + (1 + 3\cos\theta)^2 - 2(3 - \cos\theta)(1 + 3\cos\theta)\times\frac{\sqrt{3}}{2}$

$a^2 = 10\cos^2\theta + 10 - 8\sqrt{3} = \boxed{20 - 8\sqrt{3}}$

$S = \frac{1}{2}(3 - \cos\theta)(1 + 3\cos\theta)\times\frac{1}{2} = 2 \longrightarrow (3 - \cos\theta)(1 + 3\cos\theta) = 8$

$3 + 8\cos\theta - 3\cos^2\theta = 8 \longrightarrow 3\cos^2\theta - 8\cos\theta + 5 = 0 \longrightarrow \cos^2\theta - 8\cos\theta + 15 = 0$

$3 - \cos\theta > 0 \longrightarrow 3 > \cos\theta$

$1 + 3\cos\theta > 0 \longrightarrow \cos\theta > -\frac{1}{3}$

$-1 \le \cos\theta \le 1 \Big\} -\frac{1}{3} \cos\theta \le 1$ ۱۰