نام و نام خانوادگی امیرعلی تنهایی راد ...... پاسخنامه تشریحی تکلیف شماره ۱۳ ...... کلاس دوازدهم تجربی B ......

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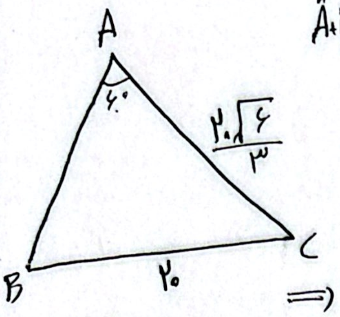

$\hat A+\underbrace{\hat B+\hat C}_{120^\circ}=180^\circ \Rightarrow A=60^\circ$

$\frac{20}{\sin 60^\circ}=\frac{\frac{20\sqrt6}{3}}{\sin\hat B}\Rightarrow \frac{20}{\frac{\sqrt3}{2}}=\frac{\frac{20\sqrt6}{3}}{\sin\hat B}$

$20\sin\hat B=\frac{20\sqrt6}{3}\times\frac{\sqrt3}{2}=\frac{10\sqrt{18}}{3}=\frac{30\sqrt2}{3}=10\sqrt2\Rightarrow \sin\hat B=\frac{10\sqrt2}{20}=\frac{\sqrt2}{2}$

$\Rightarrow \hat B=45^\circ \Rightarrow \hat B+\hat C=120^\circ \Rightarrow C=120^\circ-45^\circ=75^\circ$

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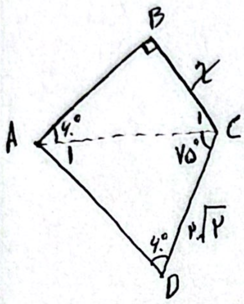

$\hat C_1=180-(90+60)=30^\circ$

$\Rightarrow \hat C=75^\circ+30^\circ=105^\circ$

$\hat A+\hat B+\hat C+\hat D=360^\circ$

$\hat A+90+60^\circ+105^\circ=360$

$\hat A=105^\circ \to \hat A_1=105-60^\circ=45^\circ$

$\frac{AC}{\sin 60^\circ}=\frac{2\sqrt2}{\sin45^\circ}\Rightarrow \frac{AC}{\frac{\sqrt3}{2}}=\frac{2\sqrt2}{\frac{\sqrt2}{2}}\Rightarrow$

$\frac{AC}{\frac{\sqrt3}{2}}=\frac{4}{1}\to AC=4\times\frac{\sqrt3}{2}=2\sqrt3$

$\frac{AC}{\sin90^\circ}=\frac{x}{\sin60^\circ}\Rightarrow 2\sqrt3=\frac{x}{\frac{\sqrt3}{2}}\Rightarrow x=2\sqrt3\times\frac{\sqrt3}{2}=3$

۳

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

$b^2-b-2=0\Rightarrow(b-2)(b+1)=0\Rightarrow \begin{cases} b=2 \checkmark \\ b=-1 \text{ غ ق ق}\end{cases}$

۴

$13^2=20^2+21^2-2(20)(21)\cos\hat B\Rightarrow 169=400+441-840\cos\hat B\Rightarrow 840\cos\hat B=672\Rightarrow$

$\cos\hat B=\frac{672}{840}=0/8=\frac45 \qquad \cos^2+\sin^2B=1\Rightarrow\frac{16}{25}+\sin^2B=1\Rightarrow\sin^2B=\frac{9}{25}\Rightarrow$

$\sin\hat B=\begin{cases}\frac35\\ -\frac35\end{cases}\xrightarrow{B<90}\frac35$

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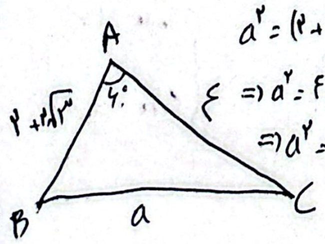


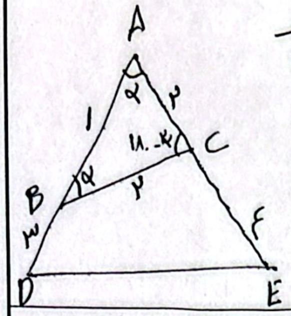
$a^2=(2+2\sqrt3)^2+(4)^2-2(4)(2+2\sqrt3)\cos60^\circ$

$\Rightarrow a^2=4+8\sqrt3+12+16-(16+16\sqrt3)\times\frac12$

$\Rightarrow a^2=32+8\sqrt3-8-8\sqrt3\Rightarrow a^2=24\Rightarrow \boxed{a=2\sqrt6}$ ← الف

ب) $\frac{2\sqrt6}{\sin60^\circ}=\frac{4}{\sin B}\Rightarrow\frac{2\sqrt6}{\frac{\sqrt3}{2}}=\frac{4}{\sin B}\Rightarrow\sin\hat B=\frac{\sqrt2}{2}\Rightarrow\boxed{\hat B=45^\circ}$

$\Rightarrow\hat C=180-(60+45)\Rightarrow\boxed{\hat C=75^\circ}$



$\frac{2}{\sin\alpha}=\frac{1}{\underbrace{\sin(180-2\alpha)}_{\sin 2\alpha}} \Rightarrow \sin\alpha = 2\times 2\sin\alpha\cos\alpha \Rightarrow \cos\alpha=\frac{1}{4}$ ۶

$DE^2=4^2+6^2-2(4)(6)(\frac{1}{4})=16+36-12=40$

$DE=\sqrt{40}=2\sqrt{10}$

$BC^2=25+64-2(5)(8)\cos 60^\circ \Rightarrow BC^2=89-80\times\frac{1}{2}\Rightarrow BC^2=49\Rightarrow BC=7$ الف)

$S=\frac{1}{2}ab\sin\alpha \Rightarrow S=\frac{1}{2}\times 5\times 8\times\underbrace{\sin 60^\circ}_{\frac{\sqrt{3}}{2}} \Rightarrow S=10\sqrt{3}$ ب)

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

$\frac{2bc(1+\cos\hat{A})}{bc(1+\cos\hat{A})}=2$ ۸

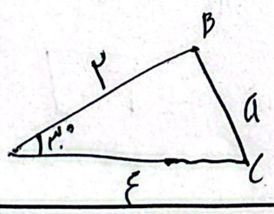
$a^3+b^3-c^3=a^3+a^2b-a^2c \to (b-c)(b^2+bc+c^2)=a^2(b-c)$

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

$a^2=b^2+c^2-2bc\cos A$ $\Rightarrow -2\cos\hat{A}=1\to\cos\hat{A}=\frac{-1}{2}$ ۹

$\frac{1}{2}(3-\cos\theta)(1+3\cos\theta)\sin 30^\circ=2 \to (3-\cos\theta)(1+3\cos\theta)=8$

$3+9\cos\theta-\cos\theta-3\cos^2\theta=8\to -3\cos^2\theta+8\cos\theta-5=0 \Rightarrow \begin{cases}\cos\theta=1 \checkmark\\ \cos\theta=\frac{5}{3} \times\end{cases}$ ۱۰



$a^2=4+16-2(2)(4)\cos 30^\circ\Rightarrow$

$a^2=20-16\frac{\sqrt{3}}{2}=20-8\sqrt{3}$