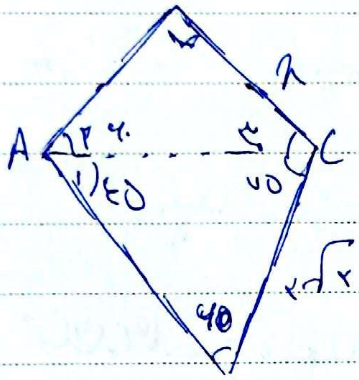
پارسا طبسی ۲۵ دوازدهم ریاضی A تکلیف ۱۳

۱- $B+C=120 \Rightarrow A=60 \Rightarrow \frac{20}{\sin A} = \frac{\frac{20\sqrt{6}}{3}}{\sin B} \Rightarrow \frac{20\sqrt{6}\times\sqrt{3}}{20\times 6}$

$= \frac{\sqrt{2}}{2} \Rightarrow \sin B = \frac{\sqrt{2}}{2} \Rightarrow B=45$ ✓ $\Rightarrow C=75^\circ$ ✓ ۲



۲- $180-135=45 \Rightarrow A_1=45^\circ$

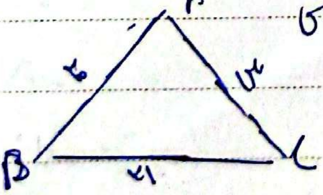
$\frac{2\sqrt{2}}{\sin A_1} = \frac{AC}{\sin 60} \Rightarrow AC = 2\sqrt{3}$ ۲

$\frac{2\sqrt{3}}{\underset{1}{\cancel{\sin 90}}} = \frac{x}{\underset{\frac{\sqrt{3}}{2}}{\cancel{\sin 60}}} \Rightarrow \frac{2\sqrt{3}\times\sqrt{3}}{2} = x = 3$ ✓

۳- $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = k \Rightarrow \frac{(b^2-2)\sin C}{\sin B} = c \Rightarrow \frac{(b^2-2)\sin C}{\sin B}$ ۲

$= k\sin C \Rightarrow b^2-2 = k\sin B = b$

$\Rightarrow b^2-2-b=0 \Rightarrow b=2$ یا $b=-1$ غ ق ق $\Rightarrow b=2$ ✓



۴- $13^2 = 21^2+20^2-2(20\times 21\times\cos B)$ قانون کسینوس

$\Rightarrow \cos B = 0/8$ ✓ $\Rightarrow \cos^2 B+\sin^2 B=1$ ۲

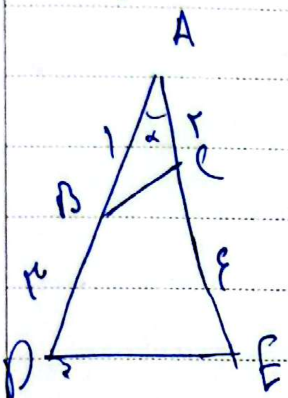
$\Rightarrow 0/64+\sin^2 B = 1 \Rightarrow \sin^2 B = 0/36 \Rightarrow \sin B = 0/6$ ✓

۵- $a=\sqrt{۱۶+۱۶+۸\sqrt{۳}-۸-۸\sqrt{۳}}=\sqrt{۲۴}\Rightarrow ۲\sqrt{۶}$ ✓

$\frac{۲\sqrt{۶}}{\sin A}=\frac{۴}{\sin C}\Rightarrow \sin C=\frac{\sqrt{۲}}{۲}\Rightarrow C=۴۵^\circ$ ✓ ②

$\frac{\sqrt{۳}}{۲}$

$۱۸۰-(۴۵+۶۰)=۷۵\Rightarrow B=۷۵^\circ$ ✓



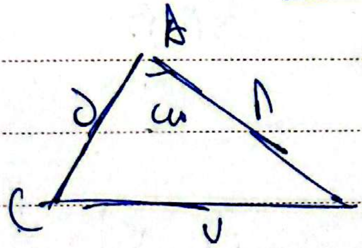
۶- $BC^۲=AB^۲+AC^۲-۲AB\cdot AC\cdot\cos\alpha$

$\Rightarrow ۴=۴+۱-۴\cos\alpha\Rightarrow\cos\alpha=\frac{۱}{۴}$ ✓

$DE^۲=~~AB~~\,AD^۲+AE^۲-۲AD\cdot AE\cos\alpha=۱۶+۳۶$ ②

$-۱۲=۴۰\Rightarrow DE=\sqrt{۴۰}=۲\sqrt{۱۰}$ ✓

[illegible]



۷- الف) $BC=\sqrt{۲۵+۶۴+(-۸۰\times\frac{۱}{۲})}=۷\Rightarrow BC=۷$ طبق قانون کسینوس ✓

ب) $S=\frac{۱}{۲}\times۵\times۸\times\frac{\sqrt{۳}}{۲}=۱۰\sqrt{۳}$ ✓ ②

۸- قانون کسینوس $\Rightarrow a^۲=b^۲+c^۲-۲bc\cos A$

(ادامه صفحه بعد)

$\frac{(b+c)^۲-a^۲}{bc(\cos A+۱)}=\frac{b^۲+۲bc+c^۲-\cancel{a^۲}-b^۲-c^۲+۲bc\cos A}{bc(\cos A+۱)}$ ②

$=\frac{2(bc+bc\cos A)}{bc(\cos A+1)}$ $\xrightarrow{\text{با تقسیم بر } bc}$ $=2$ ✓

از صورت و مخرج ساده می‌شود

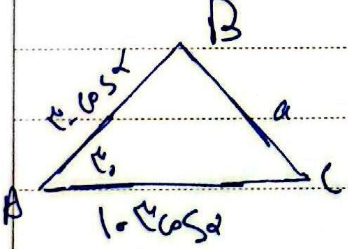
۹ـ $a^2=b^2+c^2-2bc\cos A \Leftarrow$ قانون کسینوس

$\frac{a^3+b^3-c^3}{a+b-c}=a^2 \Rightarrow a^3+b^3-c^3=a^3+a^2b-a^2c$ ‏a^3 ها ساده شد

$\Rightarrow b^3-c^3=a^2(b-c) \xrightarrow{\text{چاق و لاغر}} (\cancel{b-c})(b^2+c^2+bc)=a^2(\cancel{b-c})$ با تقسیم بر ②

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

$bc=-2bc\cos A \Rightarrow \cos A=-\frac{1}{2}$ ✓ $\longrightarrow \hat{A}=120^\circ$



۱۰ـ $S=2 \Rightarrow \frac{(3-\cos\alpha)(1+3\cos\alpha)}{4}=2$

$\Rightarrow 3+9\cos\alpha-\cos\alpha-3\cos^2\alpha=8$

$\Rightarrow 8\cos\alpha-3\cos^2\alpha=5 \Rightarrow$ [redacted] ②

$3\cos^2\alpha-8\cos\alpha+5=0 \Rightarrow \cos^2\alpha+8\cos\alpha-15=0 \Rightarrow (\cos\alpha-3)(\cos\alpha-5)$

$\Rightarrow \cos\alpha=1$ یا $\cos\alpha=\frac{5}{3}$ غ ق ق $\Rightarrow 4+16-\frac{16\sqrt{3}}{2}=20-8\sqrt{3}$ ✓