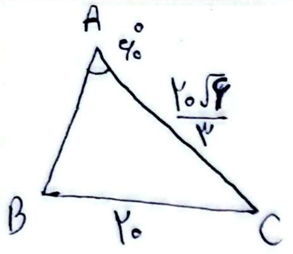
نام و نام خانوادگی آرش سلطانی ۲۵ پاسخنامه تشریحی تکلیف شماره ۱۳ کلاس دوازدهم پسر A

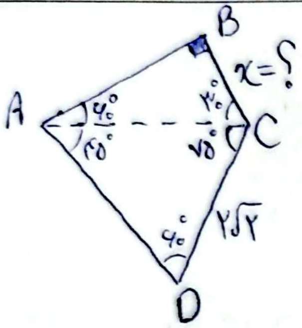


$\frac{a}{\sin\hat A}=\frac{b}{\sin\hat B}\to\frac{20}{\frac{\sqrt3}{2}}=\frac{\frac{20\sqrt6}{3}}{\sin\hat B}\to\frac{40}{\sqrt3}=\frac{20\sqrt6}{3\sin\hat B}$ — ۱

$\to6\sin\hat B=3\sqrt2\to\sin\hat B=\frac{\sqrt2}{2}\to\hat B=45^\circ$ —

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

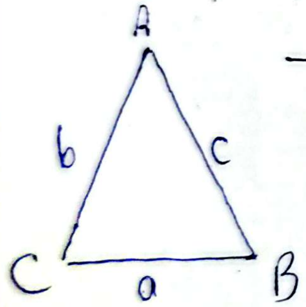
۲



$\frac{a}{\sin\hat A}=\frac{d}{\sin\hat D}\to\frac{2\sqrt2}{\frac{\sqrt2}{2}}=\frac{d}{\frac{\sqrt3}{2}}\to d=\overline{AC}=2\sqrt3$ ۲

۲

$\frac{\sqrt3}{2}$ ضلع مقابل به زاویهٔ 60° برابر وتر است $\xrightarrow{\overset{\triangle}{ABC}}BC=x=\frac{\sqrt3}{2}\overline{AC}=\frac{\sqrt3}{2}\times2\sqrt3=3$

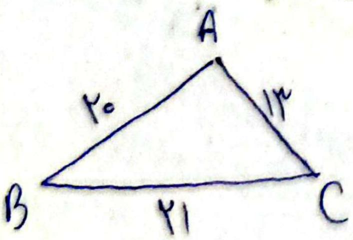


$\to(b^2-2)\frac{\sin\hat C}{\sin\hat B}=c\xrightarrow{\div\sin\hat C}\frac{c}{\sin\hat C}=\frac{b}{\sin\hat B}=\frac{b^2-2}{\sin\hat B}$ — ۳

$\to b=b^2-2\to b^2-b-2=0$ → $b=-1$ ✗ غ ق ق / $b=2$ ✓

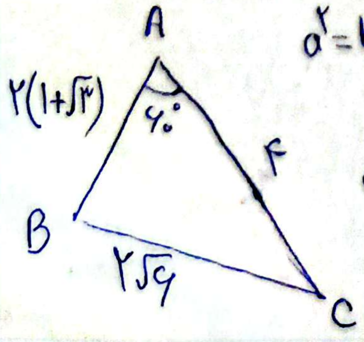
۲

با توجه به شکل $\hat B$ زاویه ای تند و Sin و Cos مثبت دارد $\to b^2=a^2+c^2-2ac\cos\hat B\to169=841-840\cos\hat B$ — ۴



$\to-672=-840\cos\hat B\to\cos\hat B=\frac45$ ۲

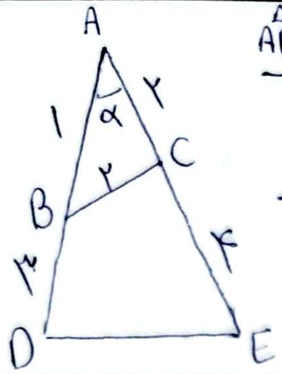
$\to\cos^2\hat B+\sin^2\hat B=1\to\sin^2\hat B=\frac{9}{25}\xrightarrow{\hat B<\frac{\pi}{2}}\sin\hat B=\frac35$



الف) $a^2=b^2+c^2-2bc\cos\underset{60^\circ}{\hat A}\to a^2=16+16+8\sqrt3-8-8\sqrt3=24\to a=2\sqrt6$ ۵

ب) $\frac{a}{\sin\hat A}=\frac{b}{\sin\hat B}\to\frac{2\sqrt6}{\frac{\sqrt3}{2}}=\frac{4}{\sin\hat B}\to4\sqrt2=\frac{4}{\sin\hat B}$ ۲

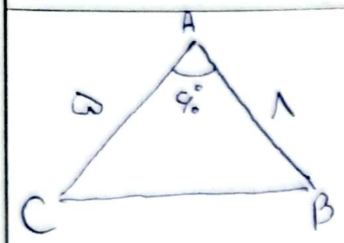
$\to\sin\hat B=\frac{\sqrt2}{2}\to\hat B=45^\circ\to\underset{60^\circ}{\hat A}+\underset{45^\circ}{\hat B}+\hat C=180^\circ\to\hat C=75^\circ$



$\overset{\triangle}{ABC} \longrightarrow a^2 = b^2 + c^2 - 2bc\cos\alpha \rightarrow 4 = 5 - 4\cos\alpha \rightarrow \cos\alpha = \frac{1}{4}$

$\overset{\triangle}{ADE} \longrightarrow a^2 = d^2 + e^2 - 2de\cos\alpha \rightarrow a^2 = 36 + 16 - 48(\underbrace{\cos\alpha}_{\frac{1}{4}}) \rightarrow$ ۶

$\rightarrow a^2 = 52 - 12 = 40 \rightarrow a = \sqrt{40} = 2\sqrt{10}$ ۲

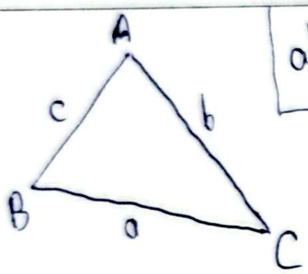


الف) $a^2 = b^2 + c^2 - 2bc\cos 60^\circ = 25 + 64 - 80(\frac{1}{2}) = 49$

$\rightarrow a = 7$ ۲

ب) $S_{\overset{\triangle}{ABC}} = \frac{1}{2} bc\sin 60^\circ = \frac{1}{2}(5)(8)(\frac{\sqrt{3}}{2})$ ۷

$= 10\sqrt{3}$



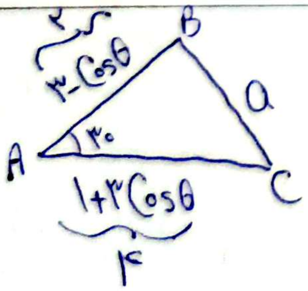
$\boxed{a^2 = b^2 + c^2 - 2bc\cos\hat{A}} \Longrightarrow \frac{(b+c)^2 - a^2}{bc(\cos\hat{A} + 1)} = \frac{b^2 + c^2 + 2bc - (b^2 + c^2 - 2bc\cos\hat{A})}{bc(\cos\hat{A} + 1)}$ ۸

$= \frac{2bc + 2bc\cos\hat{A}}{bc(\cos\hat{A} + 1)} = \frac{2bc(\cos\hat{A} + 1)}{bc(\cos\hat{A} + 1)} = 2$ ۲

$\rightarrow \cancel{a^3} + b^3 - c^3 = \cancel{a^3} + a^2 b - a^2 c \rightarrow b^3 - c^3 = a^2 b - a^2 c \rightarrow \cancel{(b-c)}(b^2 + c^2 + bc) = a^2\cancel{(b-c)}$

$\rightarrow \underbrace{b^2 + c^2 + bc = a^2}_{b^2 + c^2 - 2bc\cos\hat{A}} \Longrightarrow \cancel{bc} = -2\cancel{bc}\cos\hat{A} \rightarrow \cos\hat{A} = -\frac{1}{2}$ ۹

(نمی‌تواند $\pi < \hat{A} < \frac{3\pi}{2}$ باشد) $\hat{A} = 120^\circ$ ۲



$\rightarrow S_{\overset{\triangle}{ABC}} = \frac{1}{2}(3 - \cos\theta)(1 + 3\cos\theta)\frac{1}{2} = 2$

$\rightarrow 3 + 9\cos\theta - \cos\theta - 3\cos^2\theta = 8 \rightarrow 3\cos^2\theta - 8\cos\theta + 5 = 0$

$\cos\theta = 1$ ✓ ۱۰

$\cos\theta = \frac{5}{3}$ غ ق ق $\Longrightarrow a^2 = b^2 + c^2 - 2bc\cos 30^\circ$ ۲

$= 16 + 4 - 16(\frac{\sqrt{3}}{2}) = 20 - 8\sqrt{3}$