19,5

آروین عباسی

۱) الف) $\left(\frac{\sqrt{2}}{2}-\frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{2}}{2}+\frac{\sqrt{3}}{2}\right) \to \frac{2}{4}-\frac{3}{4}=-\frac{1}{4}$ ✓

$\left(\frac{\sqrt{2}}{2}\right)^2-\left(\frac{\sqrt{3}}{2}\right)^2$

$\frac{1}{2}-\frac{3}{4}$

(۲)

ب)

$\tan 150=\frac{\sqrt{3}}{3} \to \tan^2=\frac{1}{3}$

$\cos 330=\frac{\sqrt{3}}{2} \to \cos^2=\frac{3}{4}$

$\cos 225=-\frac{\sqrt{2}}{2} \to \cos^2=\frac{1}{2}$

$\frac{1+3(\frac{1}{3})=2}{4(\frac{3}{4})+2(\frac{1}{2}) \quad 3+1=4}=\frac{1}{2}$ ✓

۲) الف)

$\cos \sin 45=\frac{\sqrt{2}}{2}$

$\frac{\sqrt{2}}{2}\Big|\frac{\sqrt{3}}{\sqrt{6}}$

$(\sqrt{3})^2+\bigcirc=(2\sqrt{3})^2$ ABC فیثاغورس

$3+Q_{\to 9}=12$

$\to 9=x^2 \to x=3$ ✓

۳- غیرقابل قبول است

(۲)

ب)

$AH \to \frac{\sqrt{3}}{3}\Big|\frac{3\sqrt{3}}{9}$

$\tan 30=\frac{\sqrt{3}}{3}$

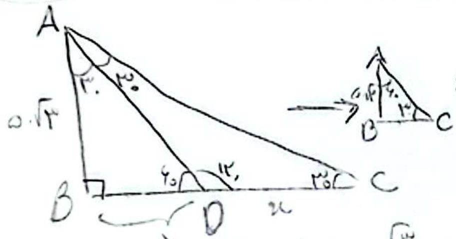
$\cos 30$

$, AC=\frac{\sqrt{3}}{2}\Big|\frac{9}{6\sqrt{3}}$

$\frac{AH}{AB}=\sin B \to \frac{3\sqrt{3}}{3\sqrt{6}} \to \frac{\sqrt{3}}{\sqrt{6}} \to \frac{\sqrt{18}}{6}\frac{3\sqrt{2}}{}=\frac{\sqrt{2}}{2}$

$45°$ ✓

۳) الف) (۲)



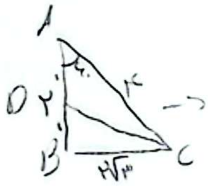
$\tan 60=\sqrt{3}$

$\frac{\sqrt{3}}{1}\Big|\frac{150}{50\sqrt{3}}=BC$

$BC-BD=x \to 150-50=100$ ✓

$\tan 30=\frac{\sqrt{3}}{3} \to \frac{\sqrt{3}}{3}\Big|\frac{50}{50\sqrt{3}}=BD$

ب)



$\cos 60=\frac{1}{2} \to \frac{1}{2}\Big|\frac{2}{4}$

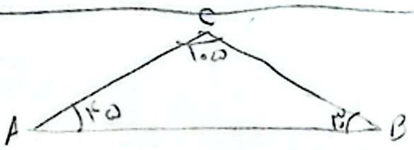
$\sin 60=\frac{\sqrt{3}}{2} \to \frac{\sqrt{3}}{2}\Big|\frac{2\sqrt{3}}{4}$

$1^2+(2\sqrt{3})^2=DC^2$

$1+12=13 \to DC=\sqrt{13}$

$\sin\alpha=\frac{1}{\sqrt{13}}=\frac{\sqrt{13}}{13}$ ✓

۴)



$\frac{AB}{\sin C}=\frac{AC}{\sin B} \to \frac{AB}{AC}=\frac{\sin C}{\sin B} \to \frac{AB}{AC}=\frac{\sin 105}{\sin 30}=$ (۲)

$\sin 105=\sin(60+45)=\sin 60\cos 45+\cos 60\sin 45=\frac{\sqrt{6}+\sqrt{2}}{4} \to \frac{AB}{AC}=\frac{\frac{\sqrt{6}+\sqrt{2}}{4}}{\frac{1}{2}}=\frac{\sqrt{6}+\sqrt{2}}{2}$ ✓

۵) چون متوازی الاضلاع است زاویا تاثیری ندارد.

$S=\frac{AB\sin\alpha}{2} \to \frac{\frac{2\times4\times\sin B}{2}}{\frac{6\times3\times\sin B}{2}} \to \frac{2\times4}{6\times3}=\frac{8}{18}=\frac{4}{9}$ ✓

(۲)

۶)

الف) $\frac{1}{2}\left(\frac{3\times4\times\sin 120}{2}\right) \Rightarrow 3\times4\times\frac{\sqrt{3}}{2} \Rightarrow \frac{12\sqrt{3}}{2} = 6\sqrt{3}$ ✓ (۲)

ب) $\frac{1}{2}ab\sin\alpha \Rightarrow \frac{1}{2}\times3\times4\times\frac{\sqrt{3}}{2} \Rightarrow 3\sqrt{3}$ ✓

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۷)

$\tan_{\text{خط}} = \frac{4-2}{3-(-1)} = \frac{2}{4} = \frac{1}{2} \Rightarrow$ (مثلث با اضلاع $\sqrt{5}$، ۱، ۲) $\Rightarrow \cos = \frac{2}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$ ✓ (۲)

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۸)

$\tan\theta = \frac{m_2-m_1}{1+m_1m_2} \Rightarrow \frac{\tan 60 - \tan 45}{1+\tan 60\tan 45} = \frac{\sqrt{3}-1}{1+\sqrt{3}} \Rightarrow \left|\frac{m-1}{1+m}\right| = 2+\sqrt{3}$ (۱,۵)

$\frac{m-1}{1+m} = 2+\sqrt{3} \Rightarrow m = -\frac{\sqrt{3}}{3}$ شیب خط

$m = -\sqrt{3}$

$y = x + \frac{5}{2} \Rightarrow \frac{5}{2} = b$ ✓

- چون هر ۲ از یک نقطه با عرض از مبدا روی محور عرض‌ها عبور می‌کنند عرض از مبدا مساوی دارند

$-\frac{\sqrt{3}}{2}\times\frac{5}{2} \Rightarrow -\frac{5\sqrt{3}}{4}$

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۹)

$f(x) = -\cos + \cos - \cot \Rightarrow \cot x \qquad f\left(\frac{5\pi}{6}\right) = \cot 150^\circ \Rightarrow -\sqrt{3}$ ✓ (۲)

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۱۰)

$8\pi+\frac{\pi}{2}$: $\sin\left(\frac{17}{2}\pi + x\right) = \sin\left(\frac{\pi}{2}+x\right) = \cos x$

$6\pi+\frac{3\pi}{2}$: $\cos\left(\frac{15}{2}\pi - x\right) = \cos\left(\frac{3\pi}{2}-x\right) = -\sin x$

صورت $\cos x - \sin x$ (۲)

$\cos(3\pi+x) = \cos(\pi+x) = -\cos x$

$\sin(6\pi - x) = \sin(-x) = -\sin x$

مخرج $\sin x - \cos x$

$\frac{\cos x - \sin x}{\sin x - \cos x} = -1$ ✓

$\sin x - \cos x = -(\cos - \sin)$