subject

Year Month Date ( )

آرمینا کبیری کوده دهم پنجشنبه ۵

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

ب) $\frac{1+2\times\frac{1}{2}}{6\times\frac{2}{6}+2\times\frac{1}{2}}=\frac{2}{4}=\frac{1}{2}$

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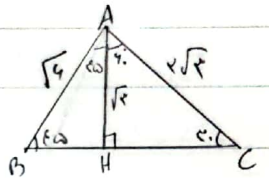
② الف)



$\sin 45^\circ=\frac{\sqrt{2}}{2}\rightarrow\frac{AH}{AB\sqrt{6}}=\frac{\sqrt{2}}{2}$

$AH=\frac{\sqrt{2}\times\sqrt{6}}{2}=\sqrt{2}$

$\sin C=\frac{\sqrt{2}}{2\sqrt{2}}=\frac{1}{2}\rightarrow C=30^\circ$

$\sin 60^\circ=\frac{\sqrt{3}}{2}=\frac{HC}{AC}\rightarrow HC=\frac{\sqrt{3}}{2}\times 2\sqrt{2}=\sqrt{6}$

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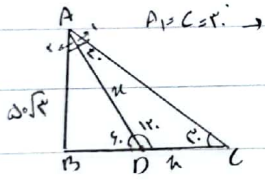
ب) $\cos 30^\circ=\frac{\sqrt{3}}{2}\rightarrow\frac{HC}{AC}=\frac{\sqrt{3}}{2}\rightarrow AC=\frac{12}{\sqrt{3}}=4\sqrt{3}$

$AH^2=(4\sqrt{3})^2-8^2=32\rightarrow AH=4\sqrt{2}$ $\sin B=\frac{AH}{AB}=\frac{4\sqrt{2}}{4\sqrt{6}}=\frac{\sqrt{2}}{2}\rightarrow B=45^\circ$

③ الف)



$A_1=C=30^\circ\rightarrow AD=DC=x$ $\sin 60^\circ=\frac{50\sqrt{2}}{x}=\frac{\sqrt{3}}{2}$

$x=100$

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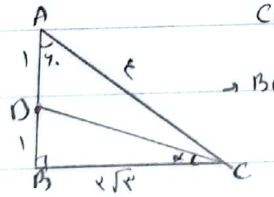
ب)



$\cos 60^\circ=\frac{1}{2}\rightarrow\frac{AB}{AC}=\frac{1}{2}\rightarrow AC=4$

$\rightarrow BC=\sqrt{16-4}=2\sqrt{3}\rightarrow DC^2=12+1=13\rightarrow DC=\sqrt{13}$

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

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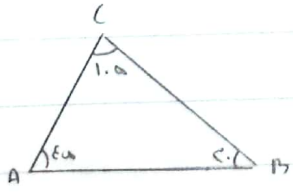
④



$\sin 105^\circ=\sin(60^\circ+45^\circ)=\sin 60^\circ\cdot\cos 45^\circ+\cos 60^\circ\cdot\sin 45^\circ$

$=\frac{\sqrt{3}}{2}\cdot\frac{\sqrt{2}}{2}+\frac{1}{2}\times\frac{\sqrt{2}}{2}=\frac{\sqrt{6}+\sqrt{2}}{4}$

$\frac{AB}{\sin C}=\frac{AC}{\sin B}\rightarrow\frac{AB}{AC}=\frac{\sin C}{\sin B}=\frac{\frac{\sqrt{6}+\sqrt{2}}{4}}{\frac{1}{2}}=\frac{\sqrt{6}+\sqrt{2}}{2}$

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⑤

$\frac{S_{ABE}}{S_{BCD}}=\frac{\frac{1}{2}\times 2\times 4\times\sin B}{\frac{1}{2}\times 2\times 6\times\sin B}=\frac{4}{6}$

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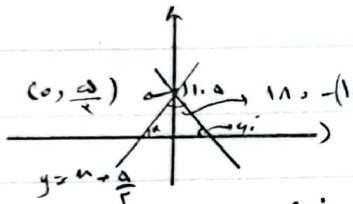
۶) الف) $S_{\square} = 2 \times 4 \times 4 \sin 120 = 32 \times \frac{\sqrt{3}}{2} = 16\sqrt{3}$

ب) $S_{\square} = \frac{1}{2} \times 2 \times 4 \times 4 \sin 120 = 16 \times \frac{\sqrt{3}}{2} = 8\sqrt{3}$

۷) $m = \tan\theta = \frac{4-2}{3-(-1)} = \frac{1}{2}$

$1 + \tan^2\theta = \frac{1}{\cos^2\theta} \Rightarrow 1 + \frac{1}{4} = \frac{5}{4} \Rightarrow \cos^2\theta = \frac{4}{5} \Rightarrow \cos\theta = \pm\frac{2}{\sqrt{5}}$ (θ در ناحیه ۱) $\Rightarrow \cos\theta = \frac{2}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$

۸)



$\alpha = 180 - (105 + 45) = 30$

$4 \tan\alpha = 1 \Rightarrow \alpha = 45$

$y = mx + b \Rightarrow m = \tan 120 = -\sqrt{3}$

عرض از مبدا هر دو خط یکی است $\Rightarrow b = \frac{5}{2}$

$mb = \frac{-5\sqrt{3}}{2}$

۹) $f\left(\frac{5\pi}{6}\right) = -\cos\left(\frac{5\pi}{6}\right) + \cos\left(\frac{5\pi}{6}\right) - \left(-\cot\left(\frac{5\pi}{6}\right)\right)$

$= \cot\left(\frac{5\pi}{6}\right) = -\sqrt{3}$

۱۰) $\frac{\cos x - \sin x}{-\cos x + \sin x} = -1$