Date: Sub: آرین شیخان

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

ب) $\frac{1+3(\frac{1}{\sqrt{3}})^2}{4(\frac{\sqrt{2}}{2})^2+2(-\frac{\sqrt{2}}{2})^2} = \frac{1+3\times\frac{1}{3}}{4\times\frac{2}{4}+2\times\frac{2}{4}} = \frac{1+1}{3+1} = \frac{2}{4} = \frac{1}{2}$

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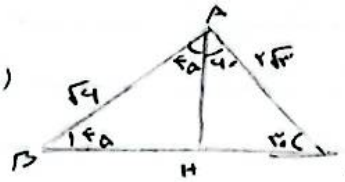
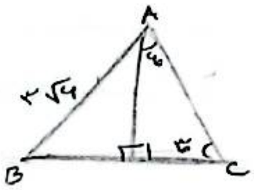
الف)



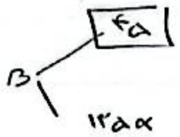
$AH = \frac{\sqrt{2}}{2}\times\sqrt{6} = \frac{2\sqrt{3}}{2} = \sqrt{3}$ $\quad AH = \frac{1}{2}AC \to C=30$ $\quad HC = \frac{\sqrt{3}}{2}\times 2\sqrt{3} = \boxed{3}$

ب)



$\frac{\sqrt{3}}{2}\times AC = 9 \to AC = 6\sqrt{3}$ $\quad AH = \frac{1}{2}\times 6\sqrt{3} = 3\sqrt{3}$ $\quad \sin B \times 3\sqrt{6} = 3\sqrt{3}$

$\sin B = \frac{\sqrt{2}}{2}$



زاویه باید حاده باشد با توجه به شکل

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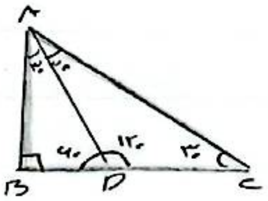
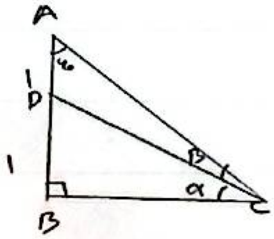
الف)



$\frac{\sqrt{3}}{2}\times AD = 50\sqrt{3} \to AD = 100$ $\quad \hat{A} = 180-(90+30) = 60$

$D\hat{A}C = 60-30 = 30$ $\quad D\hat{A}C = D\hat{C}A = 30 \to A\hat{D}C$ متساوی الساقین

$AD = 100 = x$



$\alpha+\beta = \frac{1}{2}\times AC \to AC = 4$ $\quad BC = \frac{\sqrt{3}}{2}\times AC = 2\sqrt{3}$

$DC = \sqrt{1^2+(2\sqrt{3})^2} = \sqrt{13}$ $\quad \sin\alpha\times\sqrt{13} = 1 \to \sin\alpha = \frac{\sqrt{13}}{13}$

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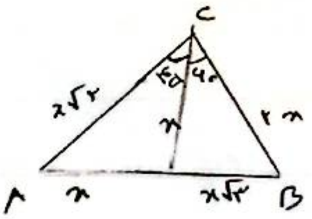
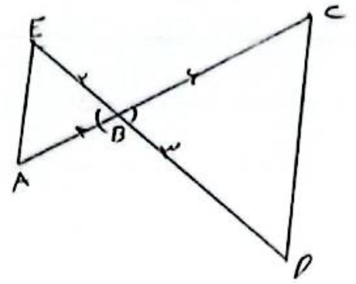


$\sin 45 = \frac{\sqrt{2}}{2} \to x = \frac{\sqrt{2}}{2}\times AC \to AC = x\sqrt{2}$

$AH = \frac{\sqrt{2}}{2}\times x\sqrt{2} = x$ $\quad H\hat{C}B = 105-45 = 60$ $\quad B = 30$

$x = \frac{1}{2}\times BC \to BC = 2x$ $\quad HB = \frac{\sqrt{3}}{2}\times 2x = x\sqrt{3}$

$\frac{AB}{AC} = \frac{x+x\sqrt{3}}{x\sqrt{2}} = \frac{x(1+\sqrt{3})}{x\sqrt{2}} = \frac{\sqrt{2}+\sqrt{6}}{2}$



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$$\frac{S_{\triangle ABE}}{S_{\triangle DBC}} = \frac{\frac{1}{2}\sin A\hat{B}E \times AB \times BE}{\frac{1}{2}\sin D\hat{B}C \times DB \times BC} \xrightarrow{\sin A\hat{B}E = \sin D\hat{B}C} \frac{2\times 4}{3\times 6} = \frac{4}{9}$$

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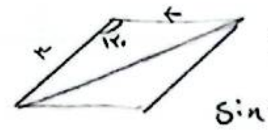
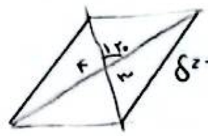
الف



$S = 3\times 4\times \frac{\sqrt{3}}{2} = 6\sqrt{3}$

$\sin 120 = \frac{\sqrt{3}}{2}$



$S = \frac{1}{2}\times 3\times 4\times \sin 120 = 3\sqrt{3}$

$\frac{\sqrt{3}}{2}$

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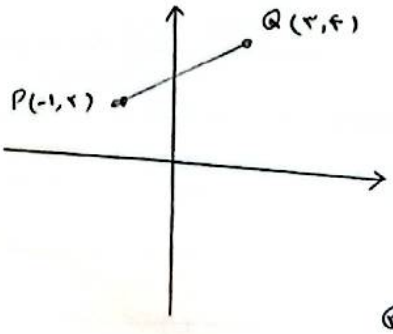

$y = ax+b \quad a = \tan\theta = \frac{\Delta y}{\Delta x} \quad \tan\alpha = \frac{4-2}{3-(-1)} = \frac{1}{2}$

با جهت + محور x

① $1+\tan^2\theta = \frac{1}{\cos^2\theta} \to \cos\theta = \pm\frac{2}{\sqrt{5}}$ $\quad \cos\theta = \frac{2\sqrt{5}}{5}$

② $1+\tan^2\theta = \frac{1}{\cos^2\theta} \to \cos\theta = \pm\frac{2}{5}$ $\quad \cos\theta = -\frac{2\sqrt{5}}{5}$

زاویه با جهت + محور x +

$\alpha = \theta : \tan\theta = \frac{1}{2}$

$\alpha = 180 - \alpha \to \tan\theta = -\tan\alpha = -\frac{1}{2}$

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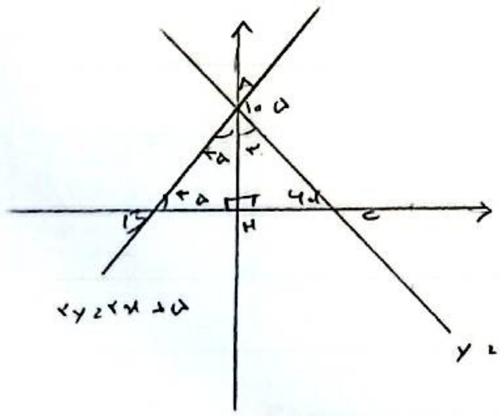

$2y = 2x+5 \to 2y = x+2/5 \quad \tan\alpha = \frac{1}{1}$ ① 45 ② $225\ \times$

$B\hat{A}H = 180-(90+45) = 45$ در مثلث زاویه ۲۲۵ نداریم

$y = mx+b$ $\quad A\hat{B}H$ متساوی الساقین , AH = عرض از مبدا = $2/5$ $\quad BH = 2/5$

$H\hat{A}C = 180-(105+45) = 30 \quad H\hat{C}A = 180-(90+30) = 60 \quad \alpha = 180-60 = 120$

$\tan 120 = -\sqrt{3} = m \quad b = 2/5$ عرض از مبدا هم یکی $\quad mb = -\sqrt{3}\times 2/5 = -\frac{5\sqrt{3}}{2}$

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$$f\left(\frac{5\pi}{6}\right) = \cos\left(\pi+\frac{5\pi}{6}\right) + \sin\left(\frac{\pi}{2}-\frac{5\pi}{6}\right) - \tan\left(\frac{3\pi}{2}+\frac{5\pi}{6}\right)$$

$$= \cos\left(\frac{5\pi}{6}\right) - \cos\left(\frac{5\pi}{6}\right) - \cot\left(\frac{5\pi}{6}\right) = -\cot 150 = \sqrt{3} \longrightarrow \cot 150 = -\sqrt{3}$$

$$\frac{\sin\left(\frac{7\pi}{2}+x\right)+\cos\left(\frac{15\pi}{2}-x\right)}{\cos(3\pi+x)-\sin(4\pi-x)} = \frac{\cos(x)-\sin(x)}{-\cos(x)+\sin(x)} = \frac{-(-\cos(x)+\sin(x))}{-\cos(x)+\sin(x)} = \boxed{-1}$$ 10

$$\frac{\sin\left(\frac{\pi}{2}+x\right)+\cos\left(\frac{\pi}{2}-x\right)}{\cos(\pi+x)-\sin(2\pi-x)}$$