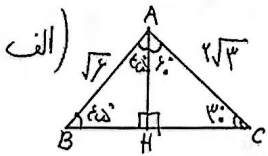
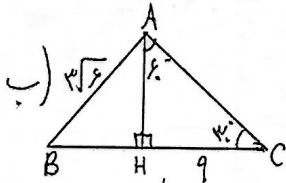


(الف) $\left(\frac{\sqrt{2}}{2} + \left(\frac{-\sqrt{3}}{2}\right)\right)\left(\frac{\sqrt{2}}{2} - \left(\frac{-\sqrt{3}}{2}\right)\right) = \left(\frac{\sqrt{2}}{2}\right)^2 - \left(\frac{\sqrt{3}}{2}\right)^2 = \frac{2}{4} - \frac{3}{4} = \boxed{\frac{-1}{4}}$

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



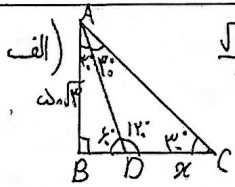
$AH = \frac{\sqrt{2}}{2} \times \sqrt{6} = \frac{\sqrt{12}}{1} = \sqrt{3}$ $\left\{ \begin{array}{l} AH = \frac{1}{2} AC \Rightarrow C = 30^\circ \\ HC = \frac{\sqrt{3}}{1} \times \sqrt{3} = \boxed{3} \end{array} \right.$



$\frac{\sqrt{3}}{2} \times AC = 9 \Rightarrow AC = 6\sqrt{3}$ $\left\{ \begin{array}{l} AH = \frac{1}{2} \times 6\sqrt{3} = 3\sqrt{3} \\ \sin B \times \sqrt{6} = 3\sqrt{3} \Rightarrow \sin B = \frac{\sqrt{2}}{2} \Rightarrow B = 45^\circ \end{array} \right.$

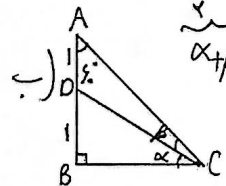
B { ① 45°

زاویه باید حاده باشد با توجه به شکل (زاویه دیگر زاویه 90° فی عنوان یک زاویه 90° نیز داشت)

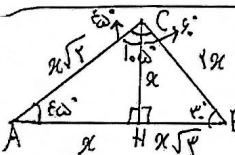


$\frac{\sqrt{3}}{2} \times AD = 10 \times \sqrt{3} \Rightarrow AD = 20$ $\left\{ \begin{array}{l} \hat{A} = 110^\circ - (60^\circ + 30^\circ) = 20^\circ \\ \hat{DAC} = 60^\circ - 30^\circ = 30^\circ \\ \hat{DAC} = \hat{DCA} = 30^\circ \Rightarrow \triangle ADC \text{ متساوی الساقین} \end{array} \right.$

$\Rightarrow AD = \boxed{20} = x$

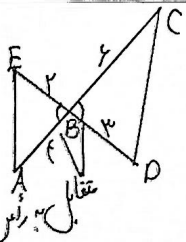


$\alpha + \beta = \frac{1}{2} \times AC \Rightarrow AC = 2$ $\left\{ \begin{array}{l} BC = \frac{\sqrt{3}}{2} \times AC = \sqrt{3} \\ DC = \sqrt{1^2 + (\sqrt{3})^2} = \sqrt{4} = 2 \\ \sin \alpha \times \sqrt{3} = 1 \Rightarrow \sin \alpha = \frac{1}{\sqrt{3}} \end{array} \right.$

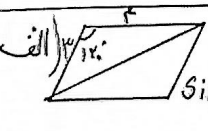


$\sin 60^\circ = \frac{\sqrt{2}}{2} \Rightarrow x = \frac{\sqrt{2}}{2} \times AC \Rightarrow AC = 2\sqrt{2}$ $\left\{ \begin{array}{l} AH = \frac{\sqrt{2}}{2} \times 2\sqrt{2} = 2 \\ HC = 10 - 2 = 8 \Rightarrow \hat{B} = 30^\circ \end{array} \right.$

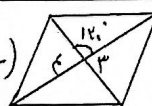
$x = \frac{1}{2} \times BC \Rightarrow BC = 2x$ $\left\{ \begin{array}{l} HB = \frac{\sqrt{3}}{2} \times 2x = x\sqrt{3} \\ \frac{AB}{AC} = \frac{2 + x\sqrt{3}}{2\sqrt{2}} = \frac{x(1 + \sqrt{3})}{2\sqrt{2}} = \frac{\sqrt{2} + \sqrt{6}}{2} \end{array} \right.$



$\frac{S_{ABE}}{S_{DBC}} = \frac{\frac{1}{2} \times \sin \hat{ABE} \times AB \times BE}{\frac{1}{2} \times \sin \hat{DBC} \times DB \times BC} = \frac{\sin \hat{ABE} \times \sin \hat{DBC}}{\sin \hat{ABE} \times \sin \hat{DBC}} \times \frac{1}{2} \times \frac{2}{2} = \boxed{\frac{1}{2}}$



$S = \frac{1}{2} \times 2\sqrt{3} \times 2\sqrt{3} = \boxed{6\sqrt{3}}$ $\left\{ \begin{array}{l} \sin 12^\circ = \frac{\sqrt{3}}{2} \end{array} \right.$



$S = \frac{1}{2} \times 2\sqrt{3} \times 2\sqrt{3} \times \sin 12^\circ = \boxed{2\sqrt{3}}$

$y = ax + b \left\{ \begin{aligned} a = \tan \theta &= \frac{\Delta y}{\Delta x} \left\{ \tan \alpha = \frac{4-2}{2-(-1)} = \frac{1}{2} \right\} \theta \left\{ \begin{aligned} ① + \text{جیب زاویه: } \alpha = \theta \Rightarrow \tan \theta = \frac{1}{2} \Rightarrow \end{aligned} \right. \\ \text{مقدارها} \end{aligned} \right. \\ ② - \text{زاویه: } \alpha = 180^\circ - \alpha \Rightarrow \tan \theta = -\tan \alpha = -\frac{1}{2} \Rightarrow \end{aligned} \right. \\ \left. \begin{aligned} ① \frac{1}{1 + \tan \theta} &= \frac{1}{\cos \theta} \Rightarrow \cos \theta = \pm \frac{2}{\sqrt{5}} \\ ② \frac{1}{1 + \tan \theta} &= \frac{1}{\cos \theta} \Rightarrow \cos \theta = \pm \frac{2}{\sqrt{5}} \end{aligned} \right\} = \left\{ \begin{aligned} ① \rightarrow \cos \theta &= \frac{+2}{\sqrt{5}} = \frac{2\sqrt{5}}{5} \text{ جهت + محور ها} \\ ② \rightarrow \cos \theta &= \frac{-2}{\sqrt{5}} = \frac{-2\sqrt{5}}{5} \text{ جهت - محور ها} \end{aligned} \right.$

$y = 2x + \omega \Rightarrow y = x + 2, \omega \Rightarrow \tan \alpha = \frac{1}{2} \Rightarrow \alpha \left\{ \begin{aligned} ① 45^\circ \checkmark \\ ② 225^\circ \text{ جهت - محور ها} \end{aligned} \right\} \Rightarrow \hat{BAH} = 180^\circ - (90^\circ + 45^\circ) = 45^\circ = \hat{A}$
 $\Rightarrow \triangle ABH$ متساوی الساقین، $AH =$ عرض از مبدأ $= 2, \omega \Rightarrow BH = 2, \omega$
 $\hat{HAC} = 180^\circ - (10^\circ + 45^\circ) = 25^\circ, \hat{HCA} = 180^\circ - (90^\circ + 25^\circ) = 65^\circ \Rightarrow C_y = 180^\circ - 65^\circ = 115^\circ \Rightarrow \tan 115^\circ = -\sqrt{3} = m$
 $b = 2, \omega$ (عرض از مبدأ دو یکی است) $\Rightarrow mb = -\sqrt{3} \times 2, \omega = \frac{-2\sqrt{3}}{2}$

$f\left(\frac{\omega\pi}{6}\right) = \cos\left(\pi + \frac{\omega\pi}{6}\right) + \sin\left(\frac{\pi}{2} - \frac{\omega\pi}{6}\right) - \tan\left(\frac{3\pi}{2} + \frac{\omega\pi}{6}\right) = \cos\left(\frac{\omega\pi}{6}\right) - \cos\left(\frac{\omega\pi}{6}\right) + \cot\left(\frac{\omega\pi}{6}\right) =$
 $\boxed{+\cot 10^\circ = -\sqrt{3}}$

$$\frac{\sin\left(\frac{17\pi}{4} + x\right) + \cos\left(\frac{15\pi}{4} - x\right)}{\cos(4\pi + x) - \sin(2\pi - x)} = \frac{\cos(x) - \sin(x)}{-\cos(x) + \sin(x)} = \frac{-(-\cos(x) + \sin(x))}{-\cos(x) + \sin(x)} = \boxed{-1}$$

$$\underbrace{(\pi + x)}_{-C \cdot \sin} + \underbrace{\sin\left(\frac{\pi}{4} - x\right)}_{C \sin} - \tan\left(\frac{\pi}{4} + x\right)$$

$-C \cdot \sin \quad + \quad C \sin \quad + \quad \cot x$

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$$f(x) = \cot x \rightarrow f\left(\frac{\omega\pi}{4}\right) = \cot\left(\frac{\omega\pi}{4}\right) = -\sqrt{3}$$