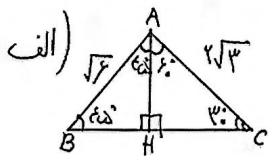
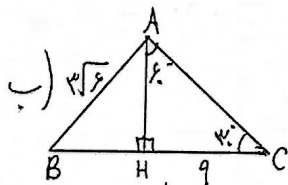


(الف) $\left(\frac{\sqrt{2}}{2} + \left(-\frac{\sqrt{3}}{2}\right)\right)\left(\frac{\sqrt{2}}{2} - \left(-\frac{\sqrt{3}}{2}\right)\right) = \left(\frac{\sqrt{2}}{2}\right)^2 - \left(\frac{\sqrt{3}}{2}\right)^2 = \frac{2}{4} - \frac{3}{4} = \boxed{-\frac{1}{4}}$

(ب) $\frac{1 + 3\left(\frac{1}{\sqrt{3}}\right)^2}{\frac{2\left(\frac{\sqrt{2}}{2}\right)^2 + 2\left(-\frac{\sqrt{3}}{2}\right)^2} = \frac{1 + 3 \times \frac{1}{3}}{2 \times \frac{2}{4} + 2 \times \frac{3}{4}} = \frac{1 + 1}{2 + 3} = \frac{2}{5} = \boxed{\frac{2}{5}}$



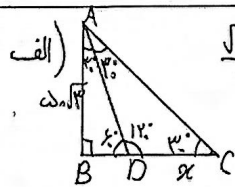
$AH = \frac{\sqrt{2}}{2} \times \sqrt{6} = \frac{\sqrt{12}}{2} = \sqrt{3}$ $\left\{ \begin{array}{l} AH = \frac{1}{2} AC = 2 \\ HC = \frac{\sqrt{3}}{2} \times \sqrt{3} = 3 \end{array} \right.$



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

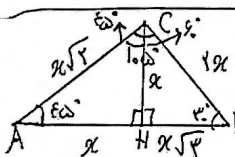
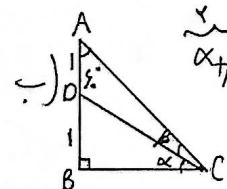
B $\left\{ \begin{array}{l} 1. 45^\circ \\ 2. 135^\circ \end{array} \right.$

زاویه باید حاده باشد (با توجه به شکل) (با وجودیک زاویه 90 درایان یک زاویه 180 نیز داشت)



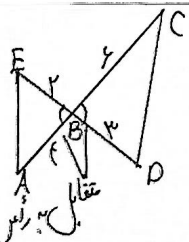
$\frac{\sqrt{3}}{2} \times AD = 1 \Rightarrow AD = 2$ $\left\{ \begin{array}{l} \hat{A} = 110^\circ (90 + 20) = 110^\circ \\ \hat{D}AC = 60 - 30 = 30^\circ \\ \hat{D}AC = \hat{D}CA = 30^\circ \Rightarrow \triangle ADC \text{ متساوی الساقین} \end{array} \right.$

$\alpha + \beta = \frac{1}{2} \times AC = 2 \Rightarrow AC = 4$ $\left\{ \begin{array}{l} BC = \frac{\sqrt{3}}{2} \times AC = 2\sqrt{3} \\ DC = \sqrt{1^2 + (2\sqrt{3})^2} = \sqrt{13} \\ \sin \alpha \times \sqrt{13} = 1 \Rightarrow \sin \alpha = \frac{\sqrt{13}}{13} \end{array} \right.$

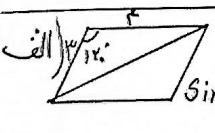


$\sin 60 = \frac{\sqrt{2}}{2} \Rightarrow x = \frac{\sqrt{2}}{2} \times AC \Rightarrow AC = x\sqrt{2}$ $\left\{ \begin{array}{l} AH = \frac{\sqrt{2}}{2} \times x\sqrt{2} = x \\ HC = 1 \Rightarrow 100 - 60 = 40^\circ \Rightarrow \hat{B} = 30^\circ \end{array} \right.$

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



$\frac{S_{ABE}}{S_{DBC}} = \frac{\frac{1}{2} \times \sin \hat{ABE} \times AB \times BE}{\frac{1}{2} \times \sin \hat{DBC} \times DB \times BC} = \frac{\sin \hat{ABE} = \sin \hat{DBC}}{\frac{1}{2} \times \frac{2}{2}} = \boxed{\frac{4}{9}}$



$S = \frac{1}{2} \times 2 \times \sqrt{3} = \sqrt{3}$ $\left\{ \begin{array}{l} \sin 15 = \frac{\sqrt{3}}{2} \end{array} \right.$ (ب) $S = \frac{1}{2} \times 2 \times \sqrt{3} \times \sin 15 = \sqrt{3}$

