

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

ب) $\frac{1 + 3 \tan^2 45^\circ}{4 \cos^2 45^\circ + 2 \cos^2 45^\circ} = \frac{1+1}{3+1} = \frac{2}{4} = \frac{1}{2}$

$\tan^2 45^\circ = \frac{1}{1}$, $\cos^2 45^\circ = \frac{1}{2}$, $\cos^2 45^\circ = \frac{1}{2}$

الف) $\overline{AH} = \frac{\sqrt{2}}{2} \times \sqrt{2} = \sqrt{2}$ } $\sin \hat{C} = \frac{AH}{AC} = \frac{1}{2} \Rightarrow \cos \hat{C} = \frac{\sqrt{3}}{2} \Rightarrow \overline{CH} = AC \cos \hat{C} = 2\sqrt{2} \times \frac{\sqrt{3}}{2} = \sqrt{3}$
 (یعنی توانسته بدون زاویه معلوم است)

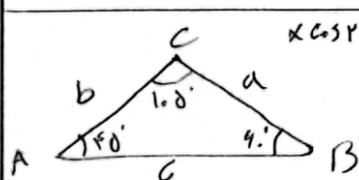
ب) $\overline{AC} = \frac{CH}{\cos \hat{C}} = \frac{9}{\frac{\sqrt{3}}{2}} = 6\sqrt{3}$ $\sin \hat{C} \propto AC = \sin \beta \propto AB \Rightarrow \frac{1}{2} \propto 6\sqrt{3} \propto \sin \beta \propto 6\sqrt{3}$

$\Rightarrow \sin \hat{\beta} = \frac{\sqrt{2}}{2} \rightarrow \left[\begin{array}{l} 45^\circ \\ 135^\circ \end{array} \right] \rightarrow \beta < 90^\circ$

الف) $BC = \cos 45^\circ \times AC = \frac{\sqrt{2}}{2} \times 100\sqrt{2} = 100$ } $CD = BC - BD = 100 - 0 = 100$
 $BD = \cos 45^\circ \times AD = \frac{1}{2} \times 100 = 50$ }
 $\star AC = AB \times 2$, $AD = AB \times \frac{1}{2}$

ب) $\cos 45^\circ = \frac{1}{2} \Rightarrow AC = 4$ $\sin 45^\circ = \frac{\sqrt{2}}{2} \Rightarrow BC = 2\sqrt{2} = \sqrt{12}$

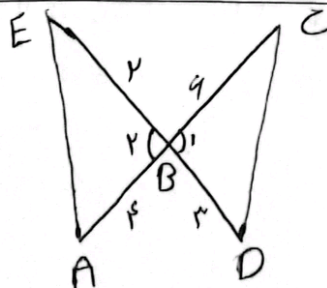
$\sqrt{2^2 + 1^2} = DC \Rightarrow DC = \sqrt{5}$ $\Rightarrow \sin \alpha = \frac{1}{\sqrt{5}} = \frac{\sqrt{5}}{5}$



$\times \cos 45^\circ = \frac{\sqrt{2}}{2}$
 $\sin 10^\circ = \frac{1 + \cos 20^\circ}{2} \Rightarrow \sin^2 10^\circ = \frac{1 + \cos 20^\circ}{2} \Rightarrow \sin 10^\circ = \frac{\sqrt{1 + \cos 20^\circ}}{2}$
 (یعنی توانسته بدون زاویه معلوم است)

$\frac{c}{\sin \hat{C}} = \frac{b}{\sin \hat{B}} \Rightarrow \frac{c}{b} = \frac{\sin \hat{C}}{\sin \hat{B}} = \frac{\frac{\sqrt{1+\sqrt{2}}}{2}}{\frac{\sqrt{2}}{2}} = \frac{\sqrt{1+\sqrt{2}}}{\sqrt{2}} = \frac{\sqrt{2+\sqrt{2}}}{\sqrt{2}}$

$\frac{S_{ABE}}{S_{BCD}} = \frac{\frac{1}{2} \times 4 \times 4 \times \sin \hat{B}_1}{\frac{1}{2} \times 4 \times 4 \times \sin \hat{B}_2} = \frac{4}{9}$
 $\hat{B}_1 = \hat{B}_2 \Rightarrow \sin \hat{B}_1 = \sin \hat{B}_2$



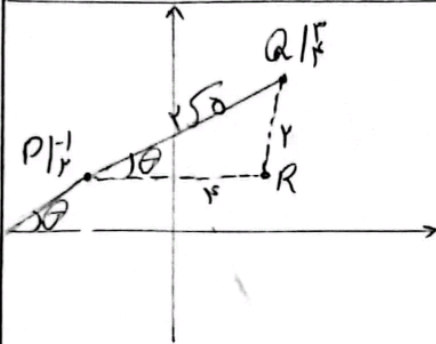
$$ج) \sum_{ABCD} = \sum_{ABD} = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{16} \times \frac{1}{2} = \frac{1}{32}$$



$$ب) \sum = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{16} \times \frac{1}{2} = \frac{1}{32}$$



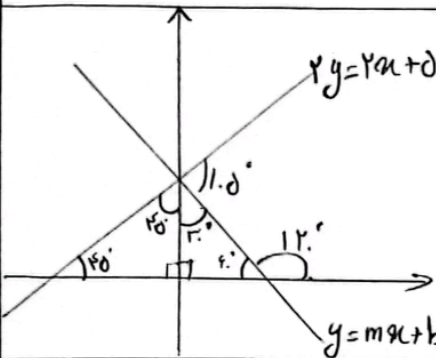
6



$$PQ = \sqrt{1^2 + 1^2} = \sqrt{2} \Rightarrow PQ = \sqrt{2} = \sqrt{2}$$

$$\cos \theta = \frac{PR}{PQ} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

7



$$y = y_0 + \frac{1}{2} \Rightarrow y = y_0 + \frac{1}{2} \Rightarrow \text{نسبة} = 1 \Rightarrow \text{مركبة} = \frac{1}{2}$$

$$\text{مركبة} = \frac{1}{2} \Rightarrow b = \frac{1}{2}$$

$$m = \tan 135^\circ = -1$$

$$\Rightarrow mb = -\frac{1}{2}$$

8

$$f(x) = \cos(x + \frac{\pi}{4}) + \sin(\frac{\pi}{4} - x) - \tan(\frac{\pi}{4} + x)$$

$$\Rightarrow f(x) = -\cos x + \cos x + \cot x = \cot x$$

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

9

$$\frac{\sin(\frac{\pi}{4} + x) + \cos(\frac{\pi}{4} - x)}{\cos(\pi + x) - \sin(\frac{\pi}{4} - x)} = \frac{\cos x - \sin x}{-\cos x + \sin x} = \frac{\cos x - \sin x}{-(\cos x - \sin x)} = -1$$

10

2