

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

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

الف) $\frac{AH}{\sqrt{6}} = \sin \hat{B} = \frac{\sqrt{2}}{2} \Rightarrow AH = \sqrt{3}$
 $\frac{AH}{AC} = \sin \hat{C} = \frac{\sqrt{3}}{2} \Rightarrow AC = \frac{2\sqrt{3}}{\sqrt{3}} = 2$
 $\frac{AH}{CH} = \tan 30^\circ = \frac{1}{\sqrt{3}} \Rightarrow CH = \sqrt{3} \times \frac{\sqrt{3}}{1} = 3$ ✓

ب) $\frac{AH}{CH} = \tan 30^\circ = \frac{1}{\sqrt{3}} \Rightarrow AH = \frac{\sqrt{3}}{3}$
 $\frac{AH}{AB} = \sin \hat{B} = \frac{\sqrt{2}}{2} \Rightarrow AB = \frac{\sqrt{3}}{\frac{\sqrt{2}}{2}} = \frac{\sqrt{6}}{2}$ ✓
 $\Rightarrow B = \begin{cases} 45^\circ \\ 135^\circ \end{cases}$ ✓ $\rightarrow$ باز است $\rightarrow$ دو جواب

الف) $\frac{BD}{AB} = \cot 45^\circ = \frac{\sqrt{3}}{1} \Rightarrow BD = \sqrt{3}$
 $\frac{BC}{AB} = \cot 30^\circ = \frac{\sqrt{3}}{\frac{1}{\sqrt{3}}} = 3 \Rightarrow BC = 3\sqrt{3}$
 $\Rightarrow \alpha + \omega = 180^\circ \Rightarrow \alpha = 100^\circ$ ✓

ب) $\frac{BC}{AB} = \tan 45^\circ = 1 \Rightarrow BC = AB = \sqrt{3}$
 $DC = \sqrt{BD^2 + BC^2} = \sqrt{3 + 3} = \sqrt{6}$
 $\sin \alpha = \frac{BD}{CD} = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$ ✓

$CH = \alpha$
 $\frac{\alpha}{HB} = \tan 30^\circ = \frac{1}{\sqrt{3}} \Rightarrow HB = \sqrt{3}\alpha$
 $\frac{AC}{\alpha} = \frac{1}{\sin 45^\circ} = \frac{1}{\frac{\sqrt{2}}{2}} = \frac{2}{\sqrt{2}} = \sqrt{2} \Rightarrow AC = \sqrt{2}\alpha$

$\frac{AB}{AC} = \frac{\alpha + \sqrt{3}\alpha}{\sqrt{2}\alpha} = \frac{\sqrt{2} + \sqrt{6}}{2}$ ✓

$\hat{B}_1 = \hat{B}_2 \rightarrow$ متقابل $\Rightarrow \sin \hat{B}_1 = \sin \hat{B}_2$

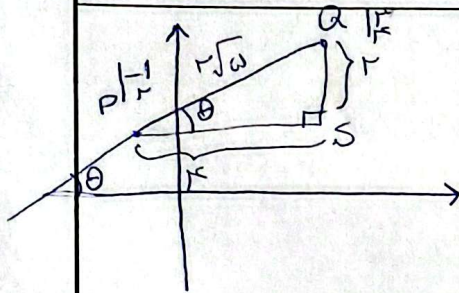
$\Rightarrow \frac{S_{ABE}}{S_{BCD}} = \frac{\frac{1}{2} \sin \hat{B}_1 \times BE \times AB}{\frac{1}{2} \sin \hat{B}_2 \times BC \times BD} = \frac{2 \times 3}{3 \times 3} = \frac{2}{3}$ ✓

الف) مساحت متوازي الاضلاع = $\frac{1}{2} \left(\frac{1}{\sqrt{3}} \sin 120^\circ \times 12 \times 12 \right) = \frac{\sqrt{3}}{2} \times 12 = \boxed{6\sqrt{3}}$ ✓

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ب) مساحت متوازي الاضلاع = $\frac{1}{2} \sin 120^\circ \times 12 \times 12 = \frac{1}{2} \times \frac{\sqrt{3}}{2} \times 12 \times 12 = \boxed{3\sqrt{3}}$ ✓

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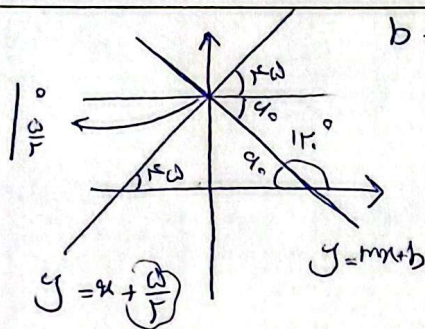


$PQ = \sqrt{1^2 + 3^2} = \sqrt{10}$

$\cos \theta = \frac{PS}{PQ} = \frac{1}{\sqrt{10}} = \frac{\sqrt{10}}{10}$ ✓

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$b = \left(\frac{5}{2} \right)$ $m = \tan 120^\circ = -\sqrt{3}$

$\Rightarrow mb = \frac{5}{2} \times (-\sqrt{3}) = \boxed{-\frac{5\sqrt{3}}{2}}$ ✓

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

$\Rightarrow f\left(\frac{5\pi}{4}\right) = \cot \frac{5\pi}{4} = \boxed{-\sqrt{3}}$ ✓

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

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