

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)
 $\frac{AH}{\sqrt{6}} = \sin B = \frac{\sqrt{2}}{2} \Rightarrow AH = \sqrt{3}$
 $\frac{AH}{AC} = \sin C = \frac{\sqrt{3}}{2} \Rightarrow AC = 2$
 $CH = AC \cos C = 2 \times \frac{\sqrt{3}}{2} = \sqrt{3}$

ب)
 $\frac{AH}{CH} = \tan 30^\circ = \frac{1}{\sqrt{3}} \Rightarrow AH = \frac{\sqrt{3}}{3}$
 $\frac{AH}{AB} = \sin B = \frac{\sqrt{2}}{2} \Rightarrow AB = \frac{\sqrt{3}}{\sqrt{2}} = \frac{\sqrt{6}}{2}$
 $\Rightarrow B = \begin{cases} 45^\circ \\ 135^\circ \end{cases}$ (با زاویه $\rightarrow$ غلط)

الف) $\frac{BD}{AB} = \cot 45^\circ = \frac{\sqrt{3}}{2} \Rightarrow BD = \frac{\sqrt{3}}{2} \times \sqrt{3} = \frac{3}{2}$
 $\frac{BC}{AB} = \cot 30^\circ = \sqrt{3} \Rightarrow BC = \sqrt{3} \times \sqrt{3} = 3$
 $\Rightarrow \alpha + \omega = 180^\circ \Rightarrow \alpha = 100^\circ$

ب) $\frac{BC}{AB} = \tan 45^\circ = 1 \Rightarrow BC = AB = \sqrt{3}$
 $DC = \sqrt{BD^2 + BC^2} = \sqrt{\left(\frac{3}{2}\right)^2 + 3^2} = \sqrt{\frac{9}{4} + 9} = \sqrt{\frac{45}{4}} = \frac{3\sqrt{5}}{2}$
 $\sin \alpha = \frac{BD}{CD} = \frac{\frac{3}{2}}{\frac{3\sqrt{5}}{2}} = \frac{1}{\sqrt{5}} = \frac{\sqrt{5}}{5}$

$CH = x$
 $\frac{x}{HB} = \tan 30^\circ = \frac{1}{\sqrt{3}} \Rightarrow HB = \sqrt{3}x$
 $\frac{AC}{x} = \frac{1}{\cos 45^\circ} = \frac{2}{\sqrt{2}} \Rightarrow AC = \sqrt{2}x$
 $\frac{AB}{AC} = \frac{x + \sqrt{3}x}{\sqrt{2}x} = \frac{\sqrt{2} + \sqrt{6}}{2}$

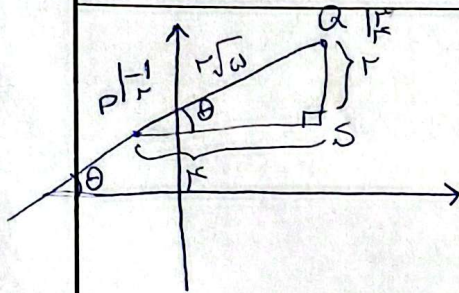
$\hat{B}_1 = \hat{B}_2 \Rightarrow \sin \hat{B}_1 = \sin \hat{B}_2$

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

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

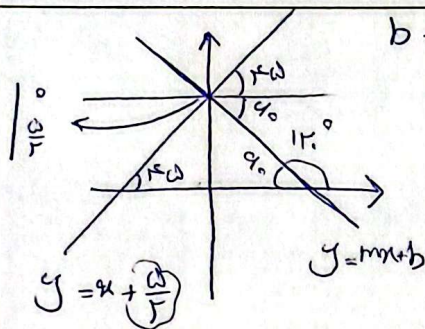
مساحت المثلث

مساحت متوازي الاضلاع = $\frac{1}{2} \sin 120^\circ \times 12 \times 12 = \frac{1}{2} \times \frac{\sqrt{3}}{2} \times 12 \times 12 = \boxed{36\sqrt{3}}$



$$PQ = \sqrt{2^2 + 2^2} = \boxed{2\sqrt{2}}$$

$$\cos \theta = \frac{PS}{PQ} = \frac{2}{2\sqrt{2}} = \boxed{\frac{\sqrt{2}}{2}}$$



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

$$\Rightarrow mb = \frac{\omega}{\sqrt{3}} \times (-\sqrt{3}) = \boxed{-\frac{\omega\sqrt{3}}{\sqrt{3}}}$$

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

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

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