

تعداد مزدوج

الف) $(\frac{\sqrt{2}}{2} - \frac{\sqrt{3}}{2})(\frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2}) = \frac{1}{2} - \frac{3}{2} = -\frac{1}{2}$ ✓

ب) $\frac{1 + 3(\frac{1}{\sqrt{3}})^2}{4(\frac{\sqrt{3}}{2})^2 + 2(-\frac{\sqrt{2}}{2})^2} = \frac{1+1}{3+1} = \frac{2}{4} = \frac{1}{2}$ ✓ (۲)

الف) In $\triangle ABH$: $\sin \hat{B} = \frac{AH}{AB} \Rightarrow \frac{\sqrt{2}}{2} = \frac{AH}{\sqrt{6}} \Rightarrow AH = \frac{\sqrt{2}\sqrt{6}}{2} = \sqrt{3}$

طبق فیثاغورس: $(HC)^2 = (AC)^2 - (AH)^2 \Rightarrow (HC)^2 = 12 - 3 = 9 \Rightarrow |HC| = 3$ طول ضلع $\Rightarrow HC = 3$ ✓ (۲)

ب) In $\triangle AHC$: $\tan 30^\circ = \frac{AH}{HC} \Rightarrow \frac{\sqrt{3}}{3} = \frac{AH}{9} \Rightarrow AH = 3\sqrt{3}$ ✓ (۲)

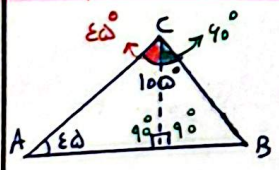
In $\triangle ABH$: $\sin \hat{B} = \frac{AH}{AB} \Rightarrow \sin \hat{B} = \frac{3\sqrt{3}}{3\sqrt{6}} = \frac{\sqrt{2}}{2} \Rightarrow \hat{B} = 45^\circ$ ✓

الف) In $\triangle ABD$: $\tan 40^\circ = \frac{AB}{BD} \Rightarrow \sqrt{3} = \frac{50\sqrt{3}}{BD} \Rightarrow BD = 50$

In $\triangle ABC$: $\tan 30^\circ = \frac{AB}{BC} \Rightarrow \frac{\sqrt{3}}{3} = \frac{50\sqrt{3}}{x+50} \Rightarrow x = 100 = DC$ ✓ (۲)

ب) In $\triangle ABC$: $\tan 40^\circ = \frac{BC}{AB} \Rightarrow \sqrt{3} = \frac{BC}{2} \Rightarrow BC = 2\sqrt{3}$

In $\triangle BCD$: طبق فیثاغورس: $(BC)^2 + (BD)^2 = (CD)^2 \Rightarrow 12 + 1 = 13 \Rightarrow CD = \sqrt{13} \Rightarrow \sin \alpha = \frac{BD}{DC} = \frac{1}{\sqrt{13}}$ ✓



$\triangle BHC$: $\tan 40^\circ = \frac{BH}{HC} \Rightarrow \sqrt{3} = \frac{x}{HC} \Rightarrow HC = \frac{x}{\sqrt{3}} \Rightarrow \frac{AB}{AC} = \frac{AH+BH}{AC}$

$\triangle ABC$: $HC = AH = \frac{x}{\sqrt{3}}$ و $\sin 45^\circ = \frac{\sqrt{2}}{2} = \frac{HC}{AC} \Rightarrow \frac{\sqrt{2}}{2} = \frac{\frac{x}{\sqrt{3}}}{AC} \Rightarrow AC = \frac{\sqrt{2}}{\sqrt{3}}x$

$AC = \frac{\sqrt{2}}{\sqrt{3}}x$

$\frac{S_{ABE}}{S_{BCD}} = \frac{\frac{1}{2} \times 2 \times 4 \sin \hat{\alpha}}{\frac{1}{2} \times 3 \times 4 \sin \hat{\beta}} \xrightarrow{\sin \hat{\alpha} = \sin \hat{\beta}} \frac{S_{ABE}}{S_{BCD}} = \frac{4}{9}$ ✓ (۲)

α, β : زیرا متقابل به رأس اند $\alpha = \beta$

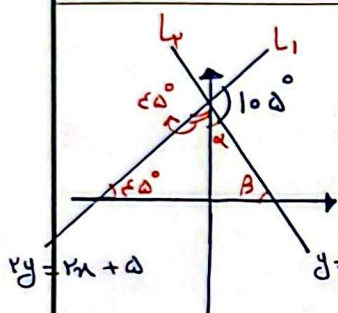
الف) $S_{ABCD} = 3 \times 4 \times \sin 120^\circ = 3 \times 4 \times \frac{\sqrt{3}}{2} = 4\sqrt{3}$ ✓

ب) $S_{ABCD} = \frac{1}{2} \times 3 \times 4 \times \sin 40^\circ = \frac{1}{2} \times 3 \times 4 \times \frac{\sqrt{3}}{2} = 3\sqrt{3}$ ✓

$\begin{bmatrix} 3 \\ 4 \end{bmatrix}$ و $\begin{bmatrix} -1 \\ 2 \end{bmatrix} \Rightarrow m = \frac{\Delta y}{\Delta x} = \frac{4-2}{3-(-1)} = \frac{2}{4} = \frac{1}{2} = \text{شیب} \Rightarrow$

$\tan \theta = \text{شیب} \Rightarrow \tan \theta = \frac{1}{2} \Rightarrow 1 + \tan^2 \theta = \frac{1}{\cos^2 \theta} \Rightarrow 1 + \left(\frac{1}{2}\right)^2 = \frac{1}{\cos^2 \theta} \Rightarrow$

$\cos^2 \theta = \frac{4}{5} \Rightarrow \cos \theta = \frac{2}{\sqrt{5}} \checkmark$
 $\cos \theta = -\frac{2}{\sqrt{5}} \Rightarrow \text{ع. ق. ق.} \Rightarrow \text{زیرا هماره است.}$



$L_1: y = 2x + 5 \xrightarrow{\text{تعیین بر مبنای}} y = (x) + (2, 5) \rightarrow \text{عرض از مبدا} \Rightarrow b = 2, 5$

شیب 1 است پس زاویه ای که با جهت مثبت محور x ها می سازد، 45° است.

$\alpha = 30^\circ \Rightarrow \beta = 45^\circ$

$m = \tan 120^\circ = -\sqrt{3}$

$mb = -\sqrt{3} \times \frac{5}{2}$

$f\left(\frac{\Delta R}{4}\right) = \cos\left(R + \frac{\Delta R}{4}\right) + \sin\left(\frac{R}{2} - \frac{\Delta R}{4}\right) - \tan\left(\frac{3R}{4} + \frac{\Delta R}{4}\right)$

$\cos\left(11\frac{R}{4}\right) + \sin\left(-\frac{R}{4}\right) - \tan\left(\frac{7R}{4}\right) = \frac{\sqrt{3}}{2} - \frac{\sqrt{3}}{2} - \sqrt{3} = -\sqrt{3}$ ✓

$\frac{\sin\left(\frac{R}{2} + x\right) + \cos\left(\frac{3R}{4} - x\right)}{\cos(R + x) - \sin(2R - x)} = \frac{\cos x - \sin x}{-\cos x - (-\sin x)} = -1$ ✓