(۶) (۲)

الف) $S = ab\sin\alpha \to 3\times 4\times \frac{\sqrt{3}}{2} = 6\sqrt{3}$ ✓

ب) $S = \frac{1}{2}ab\sin\gamma = \frac{1}{2}\times 3\times 4\times \frac{\sqrt{3}}{2} = 3\sqrt{3}$ ✓

(۷) (۲)

$\tan\theta = \frac{y_2-y_1}{x_2-x_1} = \frac{2}{4} = \frac{1}{2} \to 1+\tan^2 = \frac{1}{\cos^2} \to \frac{5}{4} = \frac{1}{\cos^2}$

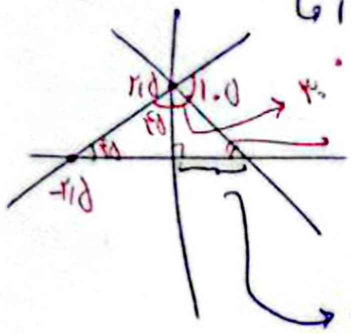
$\to \cos^2 = \frac{4}{5} \to \cos = \frac{2}{\sqrt{5}}\times\frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$ ✓

(۸) (۲)

$2y = 2x+5 \to y = x+2.5 \to 2.5 =$ عرض از مبدا

if $y=0 \to 0 = x+2.5 \to x = -2.5$ ، طول از مبدا

متساوی الساقین — زاویه $45°$



$y = mx+b \to b = 2.5$ عرض از مبدا

$\sin 60° = \frac{\sqrt{3}}{2} = \frac{2.5}{\text{وتر}} \to \text{وتر} = \frac{5\sqrt{3}}{3}$

نصف وتر $\to \frac{5\sqrt{3}}{3}\times\frac{1}{2} = \frac{5\sqrt{3}}{6}$

$m = \text{شیب خط} = \frac{y_2-y_1}{x_2-x_1} = \frac{2.5-0}{0-\frac{5\sqrt{3}}{6}} \to \frac{\frac{25}{10}}{-\frac{5\sqrt{3}}{6}} = \frac{6\times 25}{-5\sqrt{3}\times 10} = -\frac{3}{\sqrt{3}} = \frac{3\sqrt{3}}{3} = -\sqrt{3}$

$mb = -\sqrt{3}\times\frac{25}{10} = \frac{-25\sqrt{3}}{10} = -\frac{5\sqrt{3}}{2}$ ✓

(۹) (۱,۷۵)

$f(\frac{5\pi}{6}) = \cos(\pi+\frac{5\pi}{6}) + \sin(\frac{\pi}{2}-\frac{5\pi}{6}) - \tan(\frac{3\pi}{2}+\frac{5\pi}{6})$

$\cos\frac{5\pi}{6} + (-\cos\frac{5\pi}{6}) + (\cot\frac{5\pi}{6}) = +\cot\frac{5\pi}{6} = +\frac{-\frac{\sqrt{3}}{2}}{\frac{1}{2}} = -\sqrt{3}$

دقت!

(۱۰) (۲)

$\frac{\sin(\frac{17\pi}{2}+x)+\cos(\frac{15\pi}{2}-x)}{\cos(3\pi+x)-\sin(9\pi-x)} = \frac{\cos x-\sin x}{-\cos x-(-\sin x)} = \frac{-(\sin x-\cos x)}{\sin x-\cos x}$

$= -1$ ✓

الف) $(\sin 15^\circ + \sin 75^\circ)(\cos 215^\circ - \cot 15^\circ) \to \left(\frac{\sqrt{2}}{2} + \left(-\frac{\sqrt{2}}{2}\right)\right)\left(\frac{\sqrt{2}}{2} - \left(-\frac{\sqrt{2}}{2}\right)\right) \Rightarrow$

$\frac{\sqrt{2}-\sqrt{2}}{2} \times \frac{\sqrt{2}+\sqrt{2}}{2} = \frac{2-2}{4} = -\frac{1}{2}$ $\boxed{\frac{-1}{2}}$

ب) $\frac{1+2\tan^2 30^\circ}{2\cos^2 225^\circ + 2\cos^2 225^\circ} = \frac{1+\left(2\times\left(\frac{\sqrt{2}}{2}\right)^2\right)}{\left(2\times\left(\frac{\sqrt{2}}{2}\right)^2\right)+\left(2\times\left(\frac{\sqrt{2}}{2}\right)^2\right)} = \frac{2}{2+1} = \frac{1}{2}$ ✓

۲) الف) $\hat{B}_1 = 45^\circ$, $\hat{A}_1 = 45^\circ$ → مثلث قائم‌الزاویه متساوی‌الساقین → $AH^2 + BH^2 = 2 \to 2a^2 = 2 \to a = \sqrt{2} = BH = AH$

$AH^2 + HC^2 = 12 \to 2 + HC^2 = 12 \to HC^2 = 9 \to HC = 3$ ✓

ب) $\hat{A}_1 = 30^\circ \to \hat{C} = 60^\circ \to \cos 30^\circ = \frac{\sqrt{3}}{2} = \frac{9}{AC} \to AC = 9\sqrt{3} \to (9\sqrt{3})^2 = 9^2 + AH^2$

$\to AH = 3\sqrt{3} \to AB^2 = AH^2 + BH^2 \to 45 = 27 + BH^2 \to BH^2 = 27 \to BH = 3\sqrt{3}$

مثلث متساوی‌الساقین با یک زاویه قائمه → بین دو زاویه دیگر 45° می‌باشد ← $\hat{B} = 45^\circ$

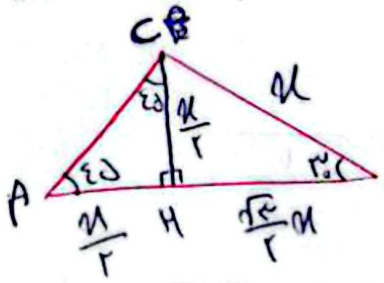
۳) الف) $AC = (2)(50\sqrt{2}) = 100\sqrt{2}$, $AD = \left(\frac{1}{\sqrt{2}}\right)(50\sqrt{2}) = 100$

$AB^2 + BC^2 = AC^2 \to 30000 = 7500 + BC^2 \to BC^2 = 22500 \to BC = 150$

$AD^2 = AB^2 + BD^2 \to 10000 = 7500 + BD^2 \to BD = 50$ $\to x = 150 - 50 = 100$ ✓

ب) $AC = 2(1+1) = 4 \to AB^2 + BC^2 = AC^2 \to 12 = 4 + BC^2 \to BC = 2\sqrt{2}$

$BC^2 + BD^2 = DC^2 \to 1^2 + 1^2 = DC^2 \to DC = \sqrt{2} \to \sin\alpha = \frac{1}{\sqrt{2}}$ $\frac{\sqrt{2}}{2}$ ✓



$BH^2 + \frac{x^2}{4} = x^2 \to BH^2 = \frac{3x^2}{4} \to BH = \frac{\sqrt{3}}{2}x$

$CH^2 + AH^2 = AC^2 \to \frac{x^2}{4} + \frac{x^2}{4} \to \frac{2x^2}{4} \to AC = \frac{\sqrt{2}x}{2}$

$\frac{AB}{AC} \to \frac{\frac{\sqrt{3}x}{2} + \frac{x}{2}}{\frac{\sqrt{2}x}{2}} \to \frac{x(1+\sqrt{3})}{\frac{\sqrt{2}x}{2}} \to \frac{x(1+\sqrt{3})}{\sqrt{2}x} \times \frac{\sqrt{2}}{\sqrt{2}}$

$\Rightarrow \frac{\sqrt{2}+\sqrt{6}}{2}$ ✓

۵) $\hat{B}_1 = \hat{B}_2$ چرا؟ → $S_{ABE} = \sin\hat{B}_1 \times \frac{1}{2} \times 2 \times 4$

$S_{CDB} = \sin B_2 \times \frac{1}{2} \times 6 \times 3$

$\frac{S_{ABE}}{S_{BCD}} = \frac{\sin\hat{B}_1 \times \frac{1}{2} \times 2 \times 4}{\sin\hat{B}_2 \times \frac{1}{2} \times 6 \times 3} = \frac{4}{9}$ ✓