آیلا جعفری - دهم تجربی A - تکلیف بیستم

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۱- الف) $(\sin 135^\circ + \sin 300^\circ)(\cos 315^\circ - \cos 150^\circ) = \left(\frac{\sqrt{2}}{2} + \left(-\frac{\sqrt{3}}{2}\right)\right)\left(\frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2}\right) = \left(\frac{\sqrt{2}}{2}\right)^2 - \left(\frac{\sqrt{3}}{2}\right)^2 = \frac{2}{4} - \frac{3}{4} = -\frac{1}{4}$

ب) $\frac{1 + 3\tan^2 210^\circ}{4\cos^2 330^\circ + 2\cos^2 225^\circ} = \frac{1 + 3\left(-\frac{1}{\sqrt{3}}\right)^2}{4\left(\frac{\sqrt{3}}{2}\right)^2 + 2\left(-\frac{\sqrt{2}}{2}\right)^2} = \frac{1+1}{3+1} = \frac{2}{4} = \frac{1}{2}$

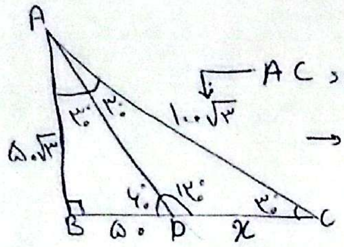
۲- الف) $\Rightarrow a = AH = BH \rightarrow 2a^2 = (\sqrt{6})^2 = 6 \rightarrow a = \sqrt{3}$, $AH = BH \Rightarrow (AH)^2 + (HC)^2 = (2\sqrt{3})^2$, $AH = \sqrt{3}$

$\Rightarrow HC = 3$

ب) $\rightarrow 9 = \frac{\sqrt{3}}{2} \times AC \rightarrow AC = 6\sqrt{3} \rightarrow AH = \frac{6\sqrt{3}}{2} = 3\sqrt{3} \rightarrow (AC)^2 = (BH)^2 + (AH)^2 \Rightarrow (3\sqrt{6})^2 = (3\sqrt{3})^2 + (BH)^2$

$\Rightarrow BH = 3\sqrt{3} \Rightarrow \hat{A} = \hat{B} = 45^\circ$

۳- الف)

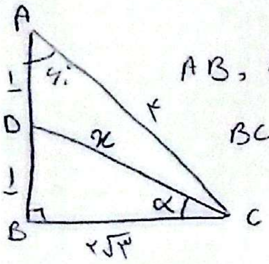


$AC = 50\sqrt{3} \times 2 = 100\sqrt{3}$

$\rightarrow x = AD$

$\rightarrow 50\sqrt{3} = \frac{\sqrt{3}}{2} \times AD \Rightarrow AD = \frac{50\sqrt{3}}{\frac{1}{\frac{\sqrt{3}}{2}}} = 100 = x$

ب)



$AB = \frac{AC}{2} \rightarrow 2 = \frac{AC}{2} \rightarrow AC = 4$

$BC = \frac{\sqrt{3}}{2} \times 4 = 2\sqrt{3}$

$x^2 = 1^2 + (2\sqrt{3})^2 = 1 + 12 = 13 \rightarrow x = \sqrt{13}$

$\sin\alpha = \frac{\text{مقابل}}{\text{وتر}} = \frac{1}{\sqrt{13}} = \frac{\sqrt{13}}{13}$

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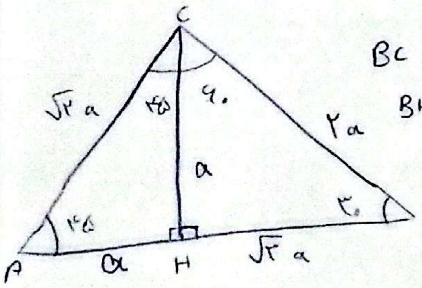

$BC = a \times 2 = 2a$

$BH = \frac{\sqrt{3}}{2} \times 2a = \sqrt{3}a$

$a^2 + a^2 = 2a^2 = AC^2 \rightarrow AC = \sqrt{2}a$

$\rightarrow \frac{AB}{AC} = \frac{a + \sqrt{3}a}{\sqrt{2}a} = \frac{\sqrt{2} + \sqrt{6}}{2}$

۵- $\frac{S_{ABE}}{S_{BCD}} = \frac{\frac{1}{2} \times BE \times AB \times \sin\hat{B}}{\frac{1}{2} \times BD \times BC \times \sin\hat{B}} = \frac{BE \cdot AB}{BD \cdot BC} = \frac{2 \times 4}{3 \times 6} = \frac{8}{18} = \frac{4}{9}$

۶- الف) $S = 2 \times \left(\frac{1}{2} \times a \times b \times \sin\alpha\right) = a \times b \times \sin 120^\circ = 3 \times 4 \times \frac{\sqrt{3}}{2} = 6\sqrt{3}$

ب) $S = \frac{1}{2} ab \sin\alpha = \frac{1}{2} \times 3 \times 4 \times \sin 120^\circ = \frac{1}{2} \times 12 \times \frac{\sqrt{3}}{2} = 3\sqrt{3}$

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$y = ax + b \rightarrow 4 = 3a + b$
$2 = -a + b$
$\Rightarrow a = \tan\theta = \frac{1}{2}$

$\rightarrow 1 + \tan^2\theta = \frac{1}{\cos^2\theta} = \frac{1 + \frac{1}{4}}{\frac{5}{4}} = \frac{1}{\cos^2\theta} \rightarrow \cos^2\theta = \frac{4}{5} \rightarrow \cos\theta = \pm\frac{2}{\sqrt{5}}$

$\Rightarrow \cos\theta = \frac{2}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$

ع قطعاً + زیرا زاویه حاده (در ناحیه اول) است.

$\tan 120 = -\sqrt{3} = m$ ، $2y = 2x + 5 \rightarrow y = x + 2.5 \rightarrow \tan\alpha = 1 \rightarrow \alpha = 45^\circ$

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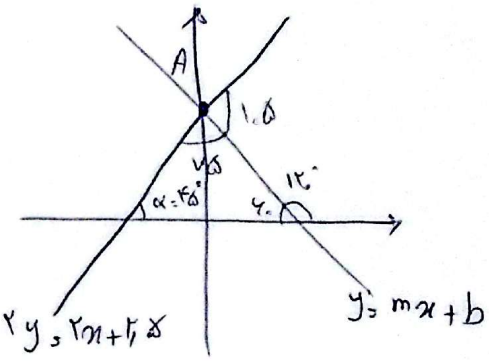
A نقطه: $y = x + 1.5 \xrightarrow{x=0} y = 1.5$ ، $y = -\sqrt{3}x + b \xrightarrow[x=0]{y=1.5} b = 1.5$

$\Rightarrow mb = (-\sqrt{3}) \times 1.5 = \frac{-5\sqrt{3}}{2}$



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

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$\Rightarrow f\left(\frac{5\pi}{4}\right) = \cot\left(\frac{5\pi}{4}\right) = ? \rightarrow \frac{5\pi}{4} = 150^\circ \rightarrow \cot 150^\circ = -\sqrt{3}$

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$$\frac{\sin\left(\frac{17\pi}{2} + x\right) + \cos\left(\frac{15\pi}{2} - x\right)}{\cos(3\pi + x) - \sin(4\pi - x)} = \frac{\sin\left(\frac{\pi}{2} + x\right) + \cos\left(\frac{3\pi}{2} - x\right)}{\cos(\pi + x) - \sin(2\pi - x)} = \frac{\cos(x) - \sin(x)}{-\cos(x) - (-\sin(x))} = -1$$