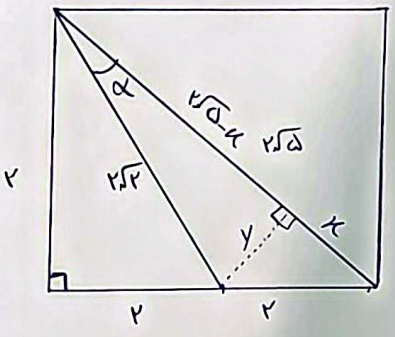
تکلیف شماره ۲۷ — معین نصری — ۱۹,۷۵ — یازدهم تجربی B

$S = \frac{ab}{2}\sin\alpha \Rightarrow \frac{\sqrt{3}}{2} \times 4 \times \frac{1}{4} \times \sin\alpha = \frac{9}{8} \Rightarrow \sin\alpha = \frac{\sqrt{3}}{2} \Rightarrow \alpha \begin{cases} \to 60^\circ \\ \to 120^\circ \end{cases}$ (۲) (۱)

$\Rightarrow \frac{\max\alpha}{\min\alpha} = \frac{120}{60} = 2$ (۲) ✓



(۲)

$(2\sqrt{5}-x)^2 + (y)^2 = (2\sqrt{2})^2 \to 20 + x^2 - 4\sqrt{5}x + y^2 = 8$ (۲)

$y^2 + x^2 = 4 \longrightarrow y^2 = 4 - x^2$

$\Rightarrow 20 + x^2 - 4\sqrt{5}x + 4 - x^2 = 8$

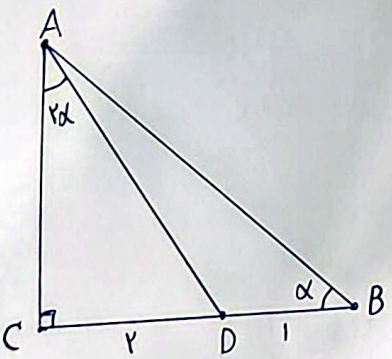
$16 = 4\sqrt{5}x$

$\frac{4}{\sqrt{5}} = x \longrightarrow y^2 = 4 - \left(\frac{16}{5}\right)$

$y^2 = \frac{20}{5} - \frac{16}{5} \Rightarrow y^2 = \frac{4}{5} \longrightarrow y = \frac{2}{\sqrt{5}}$

$\cot\alpha = \frac{\text{مجاور}}{\text{مقابل}} \Rightarrow \frac{2\sqrt{5} - \frac{4\sqrt{5}}{5}}{\frac{2\sqrt{5}}{5}}$

$\times 5 \Rightarrow \frac{10\sqrt{5} - 4\sqrt{5}}{2\sqrt{5}} = \frac{10-4}{2} = 3$ (۳) ✓



(۳) (۲)

$\tan\alpha = \frac{AC}{3}$

$\tan 2\alpha = \frac{2}{AC} \Rightarrow \tan 2\alpha = \frac{2\tan\alpha}{1-\tan^2\alpha}$

$\Rightarrow \frac{4}{AC} = \frac{\frac{4AC}{3}}{\frac{9-AC^2}{9}} \Rightarrow \frac{9-AC^2}{9} = \frac{AC^2}{4}$

$9 - AC^2 = 4AC^2$

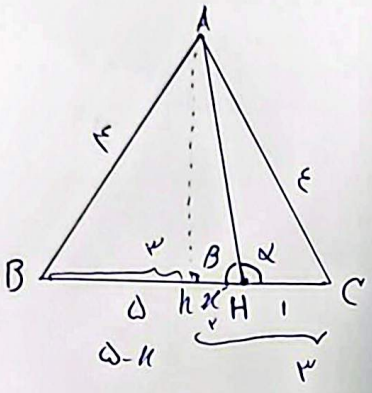
$9 = 5AC^2$

$AC = \frac{3}{\sqrt{5}}$

$\Rightarrow \tan\alpha = \frac{AC}{3} \longrightarrow \frac{\frac{3}{\sqrt{5}}}{3} = \frac{1}{\sqrt{5}}$

$\Rightarrow \cot\alpha = \frac{1}{\tan\alpha} = 2$ (۱) ✓

تألیف شماره ۲۷ — معین نوری — یازدهم فیزیک



$\alpha+\beta=180^\circ \Rightarrow |\tan\alpha| = |\cot\beta|$

$14 = Ah^2 + (5-x)^2$ (۴)

$14 = Ah^2 + (x+1)^2$ (۱,۷۵)

$(x+1)^2 = (5-x)^2$

$x+1 = 5-x$

$\boxed{x=2}$

$\Rightarrow Ah = \sqrt{14-9} = \sqrt{5}$

$|\tan\beta| = \frac{\sqrt{5}}{2} \Rightarrow \tan\alpha = -\frac{\sqrt{5}}{2} = \tan(\pi-\beta) = -\tan\beta$

$$\begin{cases} 2\sin^2 x + \cos^2 x = \frac{4}{3} \\ \sin^2 x + \cos^2 x = 1 \end{cases}$$ (۵)

$\sin^2 x = \frac{1}{3} \Rightarrow 1+\cot^2\alpha = \frac{1}{\sin^2\alpha} \Rightarrow \cot^2\alpha = 2 \longrightarrow \tan^2 x = \frac{1}{2}$ ✓ (۲)

$$\frac{\sin^4\alpha + 4\cos^2\alpha}{1+\cos^2\alpha} - \frac{\cos^4\alpha + 4\sin^2\alpha}{1+\sin^2\alpha} \longrightarrow \frac{(\sin\alpha^2)^2 + 4\cos\alpha^2}{1+\cos^2\alpha} - \frac{(\cos\alpha^2)^2 + 4\sin\alpha^2}{1+\sin^2\alpha}$$ (۴)

$$\xrightarrow{\sin^2\alpha+\cos^2\alpha=1} \frac{1+\cos^4\alpha+2\cos^2\alpha}{1+\cos^2\alpha} - \frac{1+\sin^4\alpha+2\sin^2\alpha}{1+\sin^2\alpha} = 1+\cos^2\alpha - 1 - \sin^2\alpha$$ (۲)

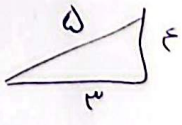
$\Rightarrow \cos^2\alpha - \sin^2\alpha = \boxed{\cos 2\alpha}$ ✓

$\sin\left(\frac{9\pi}{2}+\alpha\right)\cos\left(\frac{7\pi}{2}-\alpha\right) - \tan\left(\alpha-\frac{3\pi}{2}\right)$ (۷)

$\tan\alpha = \frac{4}{3}$

$\alpha = 3$ ناحیه (۲)

$(+\cos\alpha)(-\sin\alpha) - (-\cot\alpha) = -\cos\alpha\sin\alpha + \cot\alpha$



$+\left(+\frac{3}{5}\right)\left(-\frac{4}{5}\right) + \frac{3}{4} \Rightarrow \frac{-12}{25} + \frac{3}{4} = \frac{-48}{100} + \frac{75}{100} = \frac{27}{100}$ ✓

تکلیف شماره ۲۷ — معین نصری — یازدهم تجربی B

$x = \frac{\pi}{12}$ (۸)

(۲)

$3\cos 4x + \sqrt{2}\sin x - \sqrt{2}\cos x \to 3\cos 4x + \sqrt{2}(\sin x - \cos x)$

$\sqrt{2}\sin\left(x - \frac{\pi}{4}\right)$

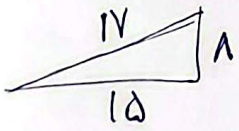
$3\cos 4x + 2\sin\left(x - \frac{\pi}{4}\right) \Rightarrow 3\cos\frac{\pi}{3} + 2\sin\left(-\frac{\pi}{6}\right) = \frac{3}{2} + \left(-\frac{2}{2}\right) = \frac{1}{2}$ ✓

$\tan\left(\frac{\alpha}{2}\right) = \frac{1}{4}$

$\frac{\tan\alpha - \sin\alpha}{\sin\alpha - \cos\alpha} = \frac{\frac{\sin\alpha}{\cos\alpha} - \sin\alpha}{\sin\alpha - \cos\alpha} = \frac{\frac{\sin\alpha - \sin\alpha\cos\alpha}{\cos\alpha}}{\sin\alpha - \cos\alpha} = \frac{\sin\alpha(1-\cos\alpha)}{\cos\alpha(\sin\alpha - \cos\alpha)}$ (۹) (۲)

$= \frac{\sin\alpha(1-\cos\alpha)}{\sin\alpha\cos\alpha - \cos\alpha^2} = \frac{\tan\alpha - \sin\alpha}{\sin\alpha - \cos\alpha} = \frac{\frac{8}{15} - \frac{8}{17}}{\frac{8}{17} - \frac{15}{17}} = \frac{\frac{136 - 120}{255}}{\frac{-7}{17}} = -\frac{16}{105}$ ✓

$\tan(\alpha) = \frac{2\tan\frac{\alpha}{2}}{1 - \tan^2\frac{\alpha}{2}} = \frac{\frac{1}{2}}{1 - \frac{1}{16}} = \frac{\frac{1}{2}}{\frac{15}{16}} = \frac{8}{15}$



(۱۰) (۲)

$2\sin\alpha < \sin 2\alpha \longrightarrow 2\sin\alpha < 2\sin\alpha\cos\alpha$ ④ ← اگر $\sin\alpha$ بزرگتر از صفر باشد آن را خط بزنیم

غ ق ن $\Rightarrow \cos\alpha > 1$

$0 < \frac{\cos\alpha}{\sin\alpha} \longrightarrow 0 < \frac{\cos\alpha}{\sin^2\alpha} \Rightarrow \cos\alpha > 0$ ① ④ ← $\sin\alpha$ مثبت است تا بعد از خط زدن آن $>$ و $\cos\alpha < 1$ که قابل قبول است

$\Rightarrow \sin\alpha < 0$ ③ ④

$\Rightarrow \alpha$ در ناحیه ۴ قرار دارد ✓