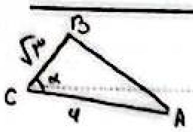
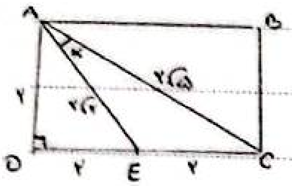
Subject:
Date

تکلیف شماره ۲۷ — یلدا ترکی — ۲۰



$S = \frac{1}{2}ab\sin\alpha \Rightarrow \frac{1}{2}\times\sqrt{3}\times 6\times\sin\alpha = 4.5 \Rightarrow \sin\alpha = \frac{\sqrt{3}}{2} \begin{cases}\alpha = 60^\circ\\ \alpha = 120^\circ\end{cases} \Rightarrow \frac{120}{60} = 2$ -۱

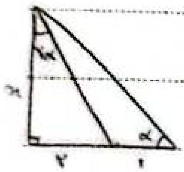


$AE = \sqrt{4+4} = 2\sqrt{2}$ $\quad AC = \sqrt{4+16} = 2\sqrt{5}$ -۲

$EC^2 = AC^2 + AE^2 - 2AC\cdot AE\cos\alpha \Rightarrow 4 = 8+20-8\sqrt{10}\cos\alpha$

$\Rightarrow 8\sqrt{10}\cos\alpha = 24 \Rightarrow \cos\alpha = \frac{3}{\sqrt{10}} \rightsquigarrow \sin^2\alpha = 1-\frac{9}{10} \Rightarrow \sin\alpha = \frac{1}{\sqrt{10}}$

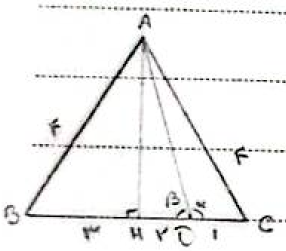
$\Rightarrow \cot\alpha = \dfrac{\frac{3}{\sqrt{10}}}{\frac{1}{\sqrt{10}}} = 3$



$\cot\alpha = \frac{3}{x}$, $\cot 2\alpha = \frac{x}{2}$ $\quad \cot 2\alpha = \frac{\cot^2\alpha - 1}{2\cot\alpha}$ -۳

$\Rightarrow \frac{x}{2} = \dfrac{\frac{9-x^2}{x^2}}{\frac{6}{x}} = \frac{9-x^2}{6x} \Rightarrow 6x^2 = 18-2x^2 \Rightarrow x^2 = \frac{9}{4} \to x = \frac{3}{2}$

$\cot\alpha = \dfrac{3}{\frac{3}{2}} = 2$



$AH = \sqrt{16-9} = \sqrt{7}$ $\quad \tan(\underset{\hat{B}}{\pi-\alpha}) = -\tan\alpha = \frac{\sqrt{7}}{2}$ -۴

$\Rightarrow \tan\alpha = \frac{-\sqrt{7}}{2}$

$3\sin^2x + \cos^2x = \frac{4}{3} \Rightarrow \sin^2x + 1 = \frac{4}{3} \Rightarrow \sin^2x = \frac{1}{3}$, $\cos^2x = 1-\frac{1}{3} = \frac{2}{3}$ -۵

$1+\tan^2x = \frac{1}{\cos^2x} \Rightarrow \tan^2x = \frac{3}{2} - 1 = \frac{1}{2}$

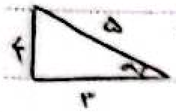
$\frac{\sin^4\alpha + 4\cos^2\alpha}{1+\cos^2\alpha} - \frac{\cos^4\alpha + 4\sin^2\alpha}{1+\sin^2\alpha} = \frac{\cos^4\alpha + 2\cos^2\alpha + 1}{1+\cos^2\alpha} - \frac{\sin^4\alpha + 2\sin^2\alpha + 1}{1+\sin^2} = \frac{(1+\cos^2\alpha)^2}{1+\cos^2\alpha} - \frac{(\sin^2\alpha+1)^2}{1+\sin^2\alpha}$ -۶

$= 1 + \cos^2\alpha - \sin^2\alpha - 1 = \cos 2\alpha$

PAPCO

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

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



$\sin\alpha = -\frac{4}{5}$, $\cos\alpha = -\frac{3}{5}$

$-\frac{3}{5}\times\frac{4}{5}+\frac{3}{4} = 0/27$

(۱)

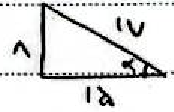
۸- $\sin x-\cos x = \sqrt{2}\sin(x-\frac{\pi}{4})$ $\qquad \sqrt{2}\sin(15-45)$

$3\cos 4x+\sqrt{2}\sin x-\sqrt{2}\cos x = 3\cos 60+\sqrt{2}(\sin 15-\cos 15) = 3\cos 60+2\sin(-30) = 3\cos 60-2\sin 30$

$= 3\times\frac{1}{2}-2\times\frac{1}{2} = \frac{1}{2}$

(۲)

۹- $\tan\alpha = \dfrac{2\tan\frac{\alpha}{2}}{1-\tan^2\frac{\alpha}{2}} = \dfrac{2\times\frac{1}{4}}{1-\frac{1}{16}} = \dfrac{8}{15}$



$\sin\alpha = \frac{8}{17}$ $\qquad \cos\alpha = \frac{15}{17}$

$\dfrac{\frac{8}{15}-\frac{8}{17}}{\frac{8}{17}-\frac{15}{17}} = \dfrac{-16}{105}$

(۲)

۱۰- $\frac{\cot x}{\sin x} > 0 \Rightarrow \frac{\cos x}{\sin^2 x} > 0 \Rightarrow \cos x > 0 \rightarrow$ ربع ۱ یا چهارم

[illegible]

$2\sin x < \sin 2x \rightarrow 2\sin x < 2\sin x\cos x \Rightarrow \sin x\cos x-\sin x > 0 \rightarrow \sin x(\cos x-1) > 0 \Rightarrow \sin x < 0$

ناحیه چهارم

(۲)