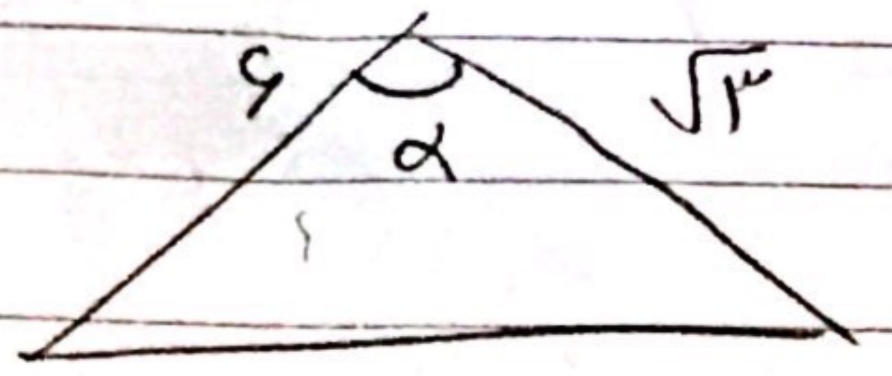
No. تکلیف شماره ۲۷ یازدهم رشته A

Date.

سانیا سیدمحمدی

۱-



$S = 6 \times \sqrt{3} \times \sin\alpha \times \frac{1}{2} = 4.5$

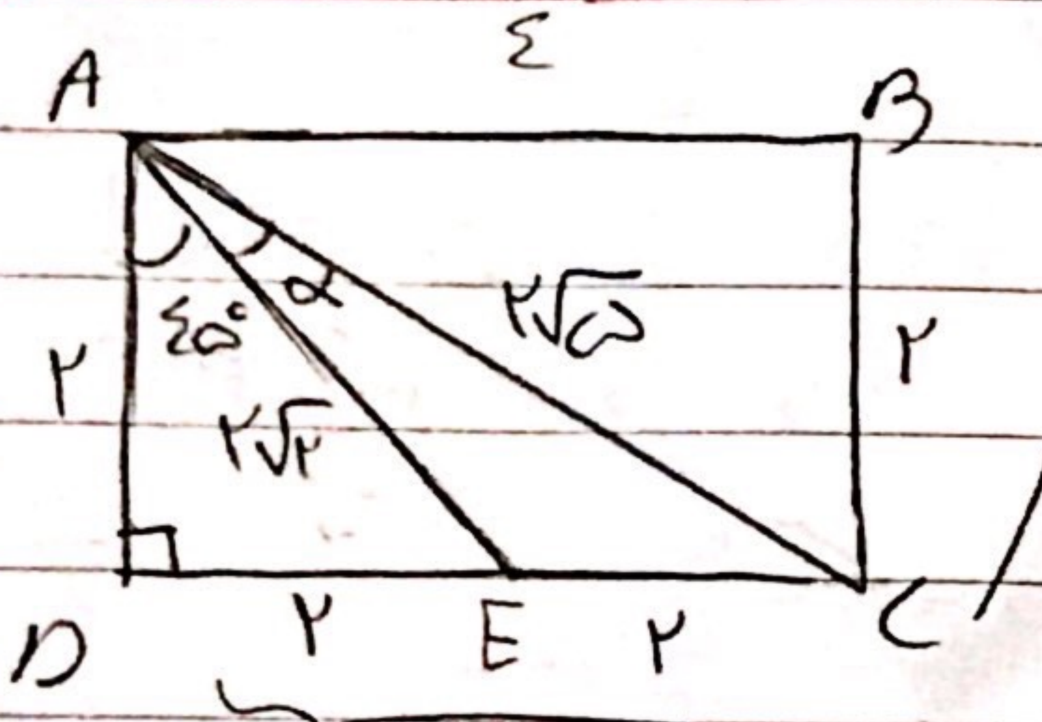
$\sin\alpha = \frac{3}{2\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{3\sqrt{3}}{6} = \frac{\sqrt{3}}{2}$

$\max \alpha \Rightarrow 120^\circ$

$\min \alpha \Rightarrow 60^\circ$

۲ برابر $\frac{120}{60} = 2 \Leftarrow$

۲-



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

$S_{A\hat{E}C} = \frac{2 \times 2}{2} = 2$

$\Rightarrow 2\sqrt{2} \times 2\sqrt{5} \times \sin\alpha \times \frac{1}{2} = 2$

$2^2 + 4^2 = 4 + 16 = 20$

$\Rightarrow AC = \sqrt{20}$

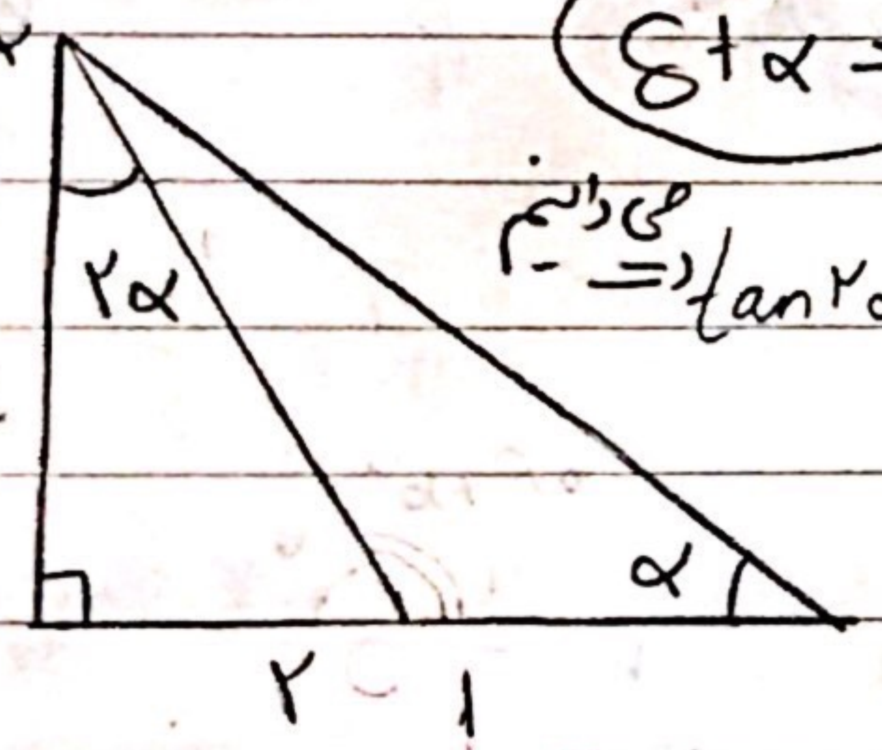
$\Rightarrow \sqrt{10} \times \sin\alpha = 1$

$\Rightarrow \sin\alpha = \frac{1}{\sqrt{10}}$

$\cos\alpha = \frac{3}{\sqrt{10}} \Leftarrow \sin^2\alpha + \cos^2\alpha = 1 \Rightarrow \frac{1}{10} + \cos^2\alpha = 1$

۳-

زاویه‌های حاده است $\Leftarrow$ $\tan\alpha$، $\cot\alpha$، $\sin\alpha$ و $\cos\alpha$ مثبت هستند



$\cot\alpha = 2$ $\qquad$ $\cot\alpha = ?$

$\tan\alpha = \frac{1}{2}$

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

$\tan 2\alpha = \frac{2}{x}$

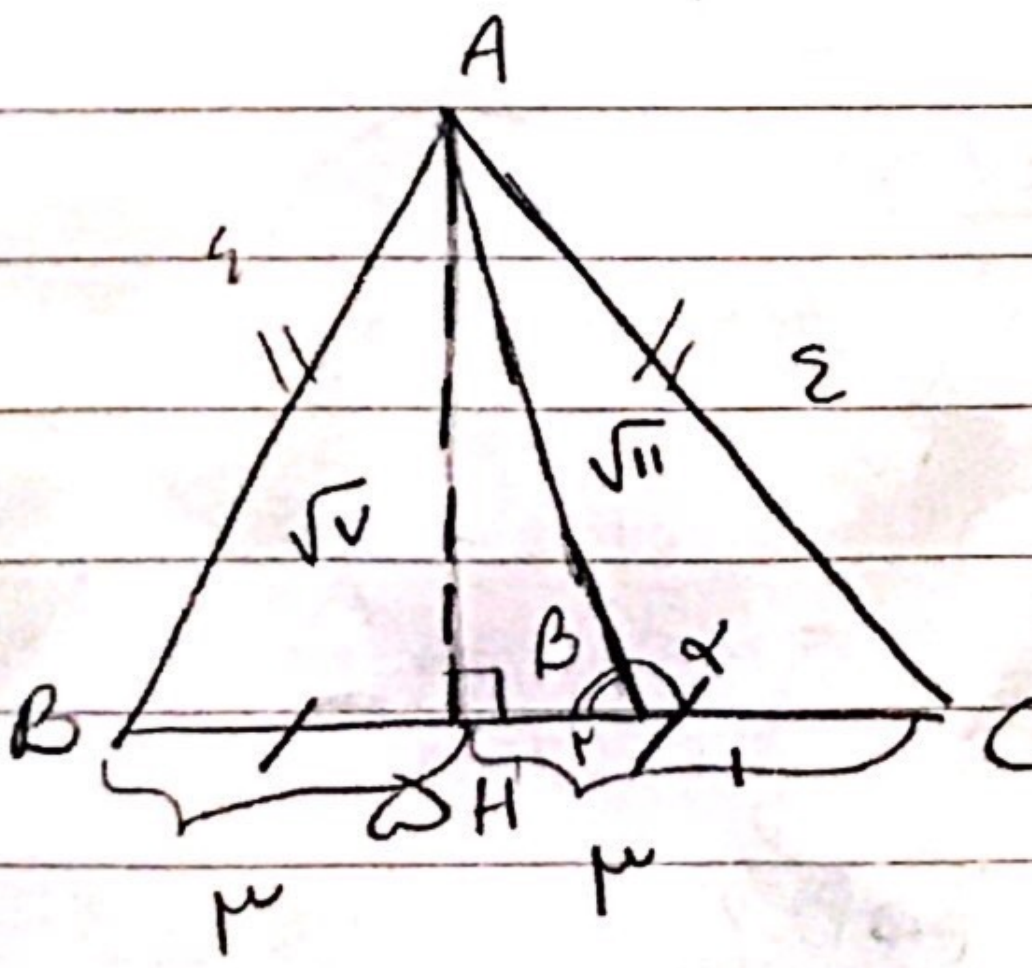
می‌دانیم $\Rightarrow \tan 2\alpha = \frac{2\tan\alpha}{1 - \tan^2\alpha}$

$\Rightarrow \frac{2}{x} = \frac{\frac{2x}{3}}{1 - \frac{x^2}{9}} = \frac{\frac{2x}{3}}{\frac{9 - x^2}{9}} = \frac{6x}{9 - x^2} = \frac{2}{x} \Rightarrow 18 - 2x^2 = 6x^2$

$18 = 8x^2 \Rightarrow \frac{9}{4} = x^2 \Rightarrow x = \frac{3}{2}$

۴-

ABC متساوی‌الساقین $\qquad \tan\alpha = ?$



$AH^2 = 16 - 9 = 7 \Rightarrow AH = \sqrt{7}$

$\Rightarrow \tan\beta = \frac{\sqrt{7}}{2}$

$\tan(\underbrace{\pi - \beta}_{\alpha}) = -\tan\beta = -\frac{\sqrt{7}}{2}$

۵-

$\tan^2 x = ?$

$2\sin^2 x + \cos^2 x = \frac{4}{3}$

$\underbrace{\sin^2 x + \cos^2 x}_{1} + \sin^2 x = \frac{4}{3}$

$\Rightarrow \sin^2 x = \frac{1}{3} \Rightarrow \sin x = \frac{\sqrt{3}}{3}$

$\frac{3}{9} + \cos^2 x = 1$

$\frac{6}{9} = \cos^2 x$

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

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Date. 1401

6-

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

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

$$=\cos^2\alpha-\sin^2\alpha \;\text{یا}\; \cos(2\alpha)$$

$\tan\alpha=\frac{4}{3}$ ، $\alpha \longrightarrow$ ربع سوم

$\Rightarrow \sin\alpha=\frac{4}{5}$, $\cos\alpha=\frac{3}{5}$ $\Rightarrow \frac{4}{5}\times-\frac{3}{5}=-\frac{12}{25}$

$$\underbrace{\sin\left(\frac{9\pi}{2}+\alpha\right)}\;\underbrace{\cos\left(\frac{7\pi}{2}-\alpha\right)}-\underbrace{\tan\left(\alpha-\frac{3\pi}{2}\right)}=\cos\alpha\times-\sin\alpha+\underbrace{\cot\alpha}_{\frac{3}{4}}$$

$\sin\left(4\pi+\frac{\pi}{2}+\alpha\right)$ $\quad \cos\left(2\pi+\frac{3\pi}{2}-\alpha\right)$ $\quad -\tan\left(\frac{3\pi}{2}-\alpha\right)=-\cot\alpha$

$\sin\left(\frac{\pi}{2}+\alpha\right)=\cos\alpha$ $\quad \cos\left(\frac{3\pi}{2}-\alpha\right)=-\sin\alpha$

$\Rightarrow \frac{3}{4}-\frac{12}{25}=\frac{27}{100}$

8

$x=\frac{\pi}{12}\Big\{$ $\frac{3}{2}+\sqrt{2}\left(\frac{-1}{\sqrt{2}}\right)=\frac{3-1}{2}$ $\quad \frac{1}{2}$

$\Big\{\frac{1}{2}=\sin\frac{\pi}{6}=2\sin\frac{\pi}{12}\times\cos\frac{\pi}{12}$ $\quad 45^\circ>\frac{\pi}{12} \Rightarrow \cos\frac{\pi}{12}>\sin\frac{\pi}{12}$

$$(3\cos 4x+\sqrt{2}\sin x-\sqrt{2}\cos x)=\underbrace{3\cos\frac{\pi}{3}}_{\frac{3}{2}}+\sqrt{2}\sin\frac{\pi}{12}-\sqrt{2}\cos\frac{\pi}{12}$$

$\sin\frac{\pi}{12}-\cos\frac{\pi}{12}=\frac{-1}{\sqrt{2}}$ $\quad \frac{1}{4}$

$$\Rightarrow \sin\frac{\pi}{12}\times\cos\frac{\pi}{12}=\frac{1}{4} \longrightarrow \left(\sin\frac{\pi}{12}-\cos\frac{\pi}{12}\right)^2=1-2\sin\frac{\pi}{12}\times\cos\frac{\pi}{12}=\frac{1}{2}$$

9-

$$\frac{\tan\alpha-\sin\alpha}{\sin\alpha-\cos\alpha}=\frac{\frac{8}{15}-\frac{8}{17}}{\frac{8}{17}-\frac{15}{17}}=\frac{\frac{8(17-15)}{17\times15}}{\frac{-7}{17}}=\frac{-16}{105}$$

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

$$\tan\alpha=\frac{2\tan\frac{\alpha}{2}}{1-\tan^2\frac{\alpha}{2}}=\frac{2\left(\frac{1}{4}\right)}{1-\frac{1}{16}}=\frac{\frac{1}{2}}{\frac{15}{16}}=\frac{8}{15}$$

$\tan\left(\frac{\alpha}{2}\right)=\frac{1}{4}$ $\quad \sin^2\alpha=\frac{64}{289}$

$$\Rightarrow \tan^2\alpha+1=\frac{1}{\cos^2\alpha} \Rightarrow \frac{64}{225}+\frac{225}{225}=\frac{289}{225} \Rightarrow \cos^2\alpha=\frac{225}{289}$$

10-

$2\sin\alpha<\sin2\alpha$ $\quad \sin2\alpha=2\sin\alpha\times\cos\alpha$

$$2\sin\alpha-2\sin\alpha\cos\alpha<0 \Rightarrow 2\sin\alpha\underbrace{(1-\cos\alpha)}_{\text{همواره نامنفی}}<0$$

$\Downarrow$

$\boxed{\sin\alpha<0}$

$$0<\frac{\cot\alpha}{\sin\alpha}$$

$$0<\frac{\frac{\cos\alpha}{\sin\alpha}}{\sin\alpha} \Rightarrow 0<\frac{\cos\alpha}{\sin^2\alpha} \Rightarrow \boxed{\cos\alpha>0}$$

ناحیه چهارم