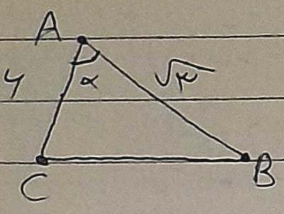
حسنا رضایی / تکلیف ۲۷ / یازدهم (دفتر)

1

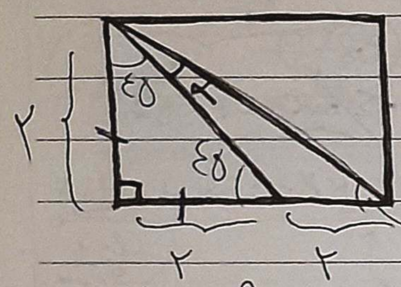


$\frac{1}{2} \times 6 \times \sqrt{3} \times \sin\alpha = \frac{9}{2}$

جمع زوایای داخل مثلث کمتر از ۱۸۰ است $\alpha < 180$

$\sin\alpha = \frac{\sqrt{3}}{2}$ → $\alpha = 60°$, $\alpha = 120°$ → $\frac{120}{60} = 2$

2

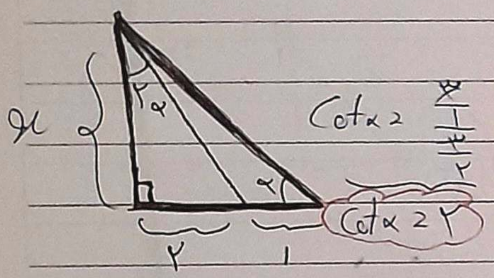


$\cot\alpha = ?$ → $45-\alpha$

$\tan(45-\alpha) = \frac{\tan 45 - \tan\alpha}{1 + \tan 45 \times \tan\alpha} = \frac{1}{2}$

ترکیب در مخرج $\frac{1-\tan\alpha}{1+\tan\alpha} = \frac{1}{2}$, $\frac{1-\tan\alpha}{2} = \frac{1}{3}$ → $3 - 3\tan\alpha = 2$ → $1 = 3\tan\alpha$ → $\frac{1}{3} = \tan\alpha$ → $3 = \cot\alpha$

3



$\cot\alpha = ?$

$\cot\alpha = \frac{3}{x}$ → $\tan\alpha = \frac{x}{3}$ → $\tan(\alpha+\alpha) = \frac{2\tan\alpha}{1-\tan^2\alpha}$

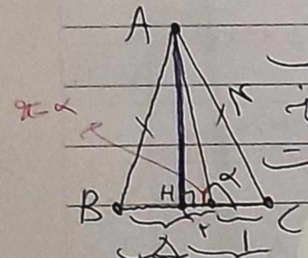
$\cot 2\alpha = \frac{x}{2}$ → $\tan 2\alpha = \frac{2}{x}$

$\frac{2}{x} = \frac{2 \frac{x}{3}}{1-\frac{x^2}{9}}$ → $\frac{1}{x} = \frac{\frac{x}{3}}{\frac{9-x^2}{9}}$ → $\frac{1}{x} = \frac{3x}{9-x^2}$

$3x^2 = 9 - x^2$ → $4x^2 = 9$ → $x^2 = \frac{9}{4}$ → $x = \frac{3}{2}$

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

4



در مثلث متساوی الساقین میانه ارتفاع هست

$AH = \sqrt{16-9}$ با فیثاغورس → $AH = \sqrt{7}$

$\tan\alpha$

$\tan(\pi-\alpha) = -\tan\alpha$

$\tan(\pi-\alpha) = \frac{\sqrt{7}}{3}$ → $\tan\alpha = -\frac{\sqrt{7}}{3}$

5

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

$\tan^2 x = ?$

→ $2(1-\cos^2 x) + \cos^4 x = \frac{4}{3}$ → $2 - 2\cos^2 x + \cos^4 x = \frac{4}{3}$

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

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

$$\frac{\cos 2\alpha}{\cos^2\alpha+1-\sin^2\alpha-1}$$

$$\frac{\sin^4\alpha+4\cos^2\alpha}{1+\cos^2\alpha}-\frac{\cos^4\alpha+4\sin^2\alpha}{1+\sin^2\alpha}$$ 6

$4(1-\sin^2\alpha)$, $4(1-\cos^2\alpha)$

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

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

$\tan\alpha=\frac{4}{3}$, $\pi<\alpha<\frac{3\pi}{2}$

$1+\tan^2\alpha=\frac{1}{\cos^2\alpha}\to\cos^2\alpha=\frac{9}{25}$, $\frac{3}{4}\cos^2\alpha$ → $\frac{27}{100}$

$1+\frac{16}{9}=\frac{25}{9}$

$\frac{3}{4}\frac{1}{\tan\alpha}(-\sin^2\alpha+1)\sim\frac{3}{4}\cos^2\alpha$

$-\tan\beta=+\tan(-\beta)$

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

$\frac{\tan\alpha}{\tan\alpha}(\cos\alpha\times-\sin\alpha+\cot\alpha)$

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

$\sin(4\pi+\theta)=\sin\theta$

$\to\sin(\frac{\pi}{2}+\alpha)\to\cos\alpha$

$\to\cos(4\pi-\theta)=\cos(\theta)$ $\to\cos(\frac{\pi}{2}+\alpha)\to\sin(\frac{\pi}{2}+\alpha)\to-\sin\alpha$

$x=\frac{\pi}{12}$

$$3\cos 2x+\sqrt{2}\sin x-\sqrt{2}\cos x\to\frac{3}{2}-1=\frac{1}{2}$$ 8

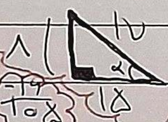
$3\cos\frac{\pi}{6}$, $\frac{1}{2}$, $\frac{3}{2}$

$\sqrt{2}(\sin x-\cos x)$

$\sqrt{2}\times\sqrt{2}\sin(x-\frac{\pi}{4})$, $2\sin(\frac{\pi}{12}-\frac{\pi}{4})$, $-2\sin\frac{\pi}{6}$, $\frac{1}{2}$, -1

$\frac{1}{4}=\tan(\frac{\alpha}{2})$ طبق فرض سوال ✗ ← $0>\tan(\frac{\alpha}{2})$ ← $\frac{3\pi}{4}>\frac{\alpha}{2}>\frac{\pi}{2}$ ← $\frac{3\pi}{2}>\alpha>\pi$

$$\frac{\tan\alpha-\sin\alpha}{\sin\alpha-\cos\alpha}=\frac{\frac{8}{15}-\frac{8}{17}}{\frac{8}{17}-\frac{15}{17}}=\frac{\frac{136-120}{15\times17}}{\frac{-7}{17}}\to-\frac{16}{105}$$ 9



$\frac{\pi}{2}>\alpha>0$ ✓ , $\tan\alpha>0$

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

$$0<\frac{\cot\alpha}{\sin\alpha}\sim\frac{\frac{\cos\alpha}{\sin\alpha}}{\sin\alpha}>0 \quad \frac{\cos\alpha}{\sin^2\alpha}>0\xrightarrow{\sin^2\alpha>0}\cos\alpha>0$$

$\sin\alpha\neq0$

$$2\sin\alpha<\sin2\alpha\to2\sin\alpha<2\sin\alpha\cos\alpha\to1<\cos\alpha\to$$ غیرممکن است 10

(انتشارات)

Parsian

پس باید طرفین نامساوی را تقسیم کنیم

پس فرض می‌کنیم $\sin\alpha<0$

$\sin\alpha<0$, $\cos\alpha>0$ ناحیه چهارم