Date: ۰۴/۱۲/۲۱ Sat. Sun. Mon. Tue. Thu. ✓ Wed. Fri. (۲۹) Subject: آرادی بنی نژاد

(۱) (۲)

$S = \frac{1}{2} \times \sqrt{3} \times 6 \times \sin\alpha = ۴/۵$

$\frac{120}{60} = 2 \Longleftarrow$ ⟶ $\sin\alpha = \frac{\sqrt{3}}{2} \rightarrow \alpha = 60$ یا 120

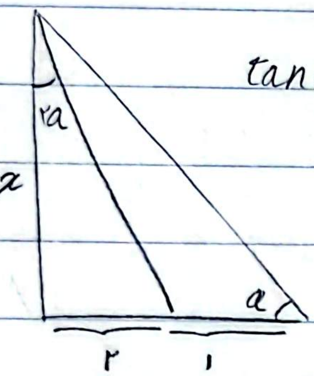
(۲) زاویه سمت چپ α را β گرفتم (۲)

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

$\tan(\alpha+\beta) = \frac{4}{2} = 2 \quad \tan\alpha = \tan((\alpha+\beta)-\beta) \rightarrow$

$\frac{\tan(\alpha+\beta) - \tan\beta}{1+\tan(\alpha+\beta)\tan\alpha} = \frac{2-1}{1+(2)(1)} = \frac{1}{3} \longrightarrow$ تانژانت آلفا $= \frac{1}{3}$

(۳) (۴)



$\tan a = \frac{x}{3} \quad \tan(2)(a) = \frac{2}{x} \quad \frac{\frac{2x}{3}}{1-\frac{x^2}{9}}$

$\tan 2a = \frac{2\tan a}{1-\tan^2 a} \Rightarrow \frac{2}{x} = \frac{\frac{2x}{3}}{1-\frac{x^2}{9}} \longrightarrow$

$\frac{2}{x} = \frac{6x}{9-x^2} \Rightarrow 6x^2+2x^2 = 18 \longrightarrow x^2 = \frac{9}{4}$

$x = \frac{3}{2} \quad \tan\alpha = \frac{x}{3} = \frac{1}{2} \quad \cot\alpha = 2$

(۴) HA (ارتفاع را) رسم کردم و جیب α را β نام دادم (M نقطه‌ای بین α, β است) (۴)

$CH = 6 - 3 = 3 \longrightarrow HM = 2 \quad AH^2 + HC^2 = 16 \quad AH^2 + 9 = 16$

$\tan\beta = \frac{AH}{HM} = \frac{\sqrt{7}}{2} \quad \tan\alpha = \tan(180-\beta) \longleftarrow AH = \sqrt{7}$

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

(۵) (۴)

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

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

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

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$$\frac{\sin^4\alpha + 4(1-\sin^2\alpha)}{1+\cos^2\alpha} = \frac{\cos^4\alpha + 3(1-\cos^2\alpha)}{1+\sin^2\alpha} = 1$$ (۶)

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

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

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

$$-\tan\left(\alpha - \frac{3\pi}{2}\right) = \tan\left(\frac{3\pi}{2} - \alpha\right) = \cot\alpha$$ (۵)

$$\left(-\frac{3}{5}\right)\left(\frac{4}{5}\right) + \frac{3}{5} = \frac{36}{100} = 0.36$$

$$(2\cos^2 x + \sqrt{2}\sin x - \sqrt{2}\cos x)_{x=\frac{\pi}{12}}$$ (۸)

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

$$\rightarrow 2\cos^2\frac{\pi}{12} + 2\sin\left(\frac{-\pi}{6}\right) = 2\left(\frac{1}{2}\right) - 2\left(\frac{1}{2}\right) = \frac{1}{2}$$ (۶)

$$\tan\alpha = \frac{2\tan\frac{\alpha}{2}}{1-\tan^2\frac{\alpha}{2}} = \frac{\frac{1}{2}}{1-\frac{1}{4}} = \frac{8}{10} \qquad \sin\alpha = \frac{(2)(\tan\frac{\alpha}{2})}{1+\tan^2\frac{\alpha}{2}} = \frac{1}{2}\cdot\frac{1}{1+\frac{1}{4}}$$ (۹)

$$= \frac{8}{17} \Rightarrow \cos\alpha = \sqrt{1-\sin^2\alpha} = \frac{15}{17} \longrightarrow \frac{\tan\alpha - \sin\alpha}{\sin\alpha - \cos\alpha} =$$

$$\frac{\frac{8}{15} - \frac{8}{17}}{\frac{8}{17} - \frac{15}{17}} = \frac{-17}{15\cdot 8}$$

$$\sin\alpha - \sin\alpha\cos\alpha < 0$$ (۱۰)

$$\sin\alpha(1-\cos\alpha) < 0 \rightarrow \sin\alpha \text{ منفی}$$ (۵)

$$\frac{\cot\alpha}{\sin\alpha} > 0 \quad \cot\alpha < 0 \quad \frac{\cos\alpha}{\sin\alpha} < 0 \quad (\cos\alpha > 0)$$

ادامه