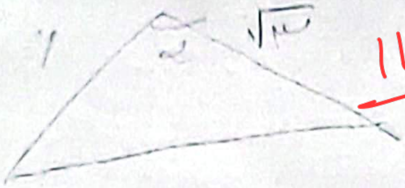
۱۷,۵

①



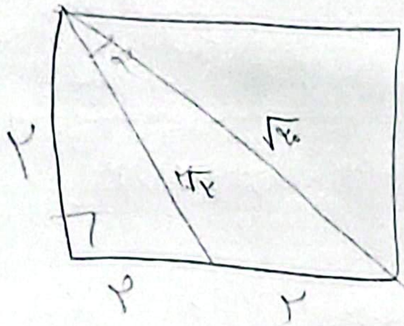
$\frac{۴\sqrt{۳}}{۲} \times \sin\alpha = ۴,۵$

$\Rightarrow \sin\alpha = \frac{\sqrt{۳}}{۲} \Rightarrow \alpha = ۶۰, ۱۲۰$

$\frac{a_1}{a_2} = ۲$ ✓ ②

امیرحسین نوروزی
یازدهم B

②

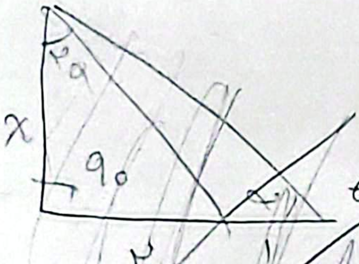


$\Rightarrow \sin\alpha \times \frac{1}{۲} \times ۲\sqrt{۲} \times ۲\sqrt{۵} = \frac{۲ \times ۲}{۲}$ ②

$\Rightarrow ۲\sqrt{۱۰}\sin\alpha = ۲ \Rightarrow \sin\alpha = \frac{\sqrt{۱۰}}{۱۰}$

$\Rightarrow \cos\alpha = \frac{۳\sqrt{۱۰}}{۱۰} \Rightarrow \cot\alpha = ۳$ ✓

③

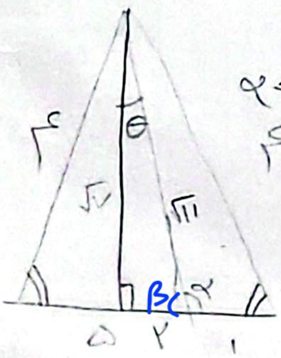


$\tan\alpha = \frac{۳}{x}$

~~$\tan ۲\alpha = \frac{۲\tan\alpha}{1 - \tan^2\alpha} = \frac{۲}{x} \Rightarrow \frac{\frac{۳}{x}}{\frac{x^2 - ۹}{x^2}} = \frac{۴}{x} = \frac{۳x}{x^2 - ۹} = \frac{۴}{x}$~~

$\Rightarrow ۳x^2 = ۴x^2 - ۹ \Rightarrow x^2 + ۹ = 0$

④



$\alpha = ۹۰ + \theta$

$\Rightarrow \tan\alpha = \cot\theta \Rightarrow -\frac{\sqrt{۷}}{۲} = \tan\alpha$ (۱,۷۵)

$\tan\alpha = \tan(\pi - \beta) = -\tan\beta = -\frac{\sqrt{۷}}{۲}$

⑤

(۱,۷۵)

~~$\sin^2 x + \cos^2 x + \sin^2 x = \frac{۴}{۳}$~~

$\Rightarrow |\sin x| = \frac{\sqrt{۳}}{۳} \Rightarrow \left|\frac{\sin x}{\cos x}\right| = \frac{\sqrt{۲}}{۲}$

$\sin^2 x + \underbrace{\sin^2 x + \cos^2 x}_{1} = \frac{۴}{۳}$

$\sin^2 x = \frac{1}{۳}$

خواسته سوال $\leftarrow \tan^2 x = \frac{\sin^2 x}{\cos^2 x} = \frac{\sin^2 x}{1 - \sin^2 x} = \boxed{\frac{1}{۲}}$

$$\frac{\cos^4 a + 4\sin^2 a}{} = \frac{\cos^4 a - 4\cos^2 a + 4}{}$$

(۲)

$$\frac{\cos^4 a + 4\sin^2 a}{} = \frac{\cos^4 a - 4\cos^2 a + 4}{4 - \cos^2 a}$$

$$\Rightarrow -(4 - \cos^2 a) + (4 - \sin^2 a) = \cos^2 a - \sin^2 a = \cos 2a$$

(۱)

(۱)

$$\tan\alpha = \frac{4}{3} \Rightarrow \sin\alpha = 4x \quad \cos\alpha = 3x$$

$$\Rightarrow 25x^2 = 1 \Rightarrow \sin\alpha = -\frac{4}{5} \quad \cos\alpha = -\frac{3}{5}$$

$$\cos\alpha \times (\sin 2) + \cot\alpha = \frac{-12}{25} + \frac{3}{4} = \frac{123}{100} = 1.23$$

۱,۷۹

۰,۲۷

(۱)

$$\sqrt{2}\sin\frac{\pi}{12} - \sqrt{2}\cos\frac{\pi}{12} + 2\cos\frac{\pi}{2}$$

(۲)

$$\sin\frac{\pi}{12} = \sin\left(\frac{\pi}{4} - \frac{\pi}{6}\right) = \sin\frac{\pi}{4}\cdot\cos\frac{\pi}{6} - \sin\frac{\pi}{6}\cdot\cos\frac{\pi}{4}$$

$$= \frac{\sqrt{6}}{4} - \frac{\sqrt{2}}{4} = \frac{\sqrt{3}-1}{2\sqrt{2}}$$

$$\cos\left(\frac{\pi}{4} - \frac{\pi}{6}\right) = \cos\frac{\pi}{4}\cos\frac{\pi}{6} + \sin\frac{\pi}{6}\sin\frac{\pi}{4}$$

$$\frac{\sqrt{2}}{2}\left(\frac{1}{2} + \frac{\sqrt{3}}{2}\right) = \frac{\sqrt{3}+1}{2\sqrt{2}}$$

$$-1 + \frac{3}{2} = \frac{1}{2}$$ ✓

(۳)

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

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

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

$$\Rightarrow \sin\alpha = \frac{8}{17} \quad \cos\alpha = \frac{15}{17} \Rightarrow \frac{\frac{8}{15} - \frac{8}{17}}{\frac{8}{17} - \frac{15}{17}} = \frac{\frac{16}{15\times 17}}{\frac{-7}{17}}$$

$$\frac{16}{-105}$$ ✓

$\frac{\cos\alpha}{\sin^2\alpha} > 0 \Rightarrow \cos\alpha > 0$ (۲)

$\sin\alpha \neq 0$

$2\sin\alpha < 3\sin^2\alpha \Rightarrow 2\sin\alpha < 2\sin\alpha\cos\alpha$

$\Rightarrow 2\sin\alpha(1-\cos\alpha) < 0$

$0 < 1-\cos\alpha \leq 1 \Rightarrow \sin\alpha < 0$

$\sin\alpha < 0$

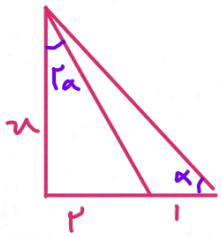
$\cos\alpha > 0 \Longrightarrow$ ربع چهارم ✓

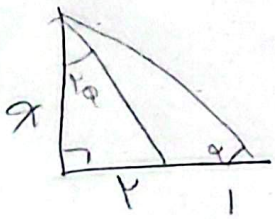
۳- $\tan 2\alpha = \frac{2}{3}$

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

$\frac{2}{3} = \frac{2(\frac{3}{4})}{1-\frac{3^2}{4}} \rightarrow 3 = \frac{3}{2} \rightarrow \tan\alpha = \frac{1}{2}$

$\cot\alpha = 2$





(۳) (۰/۲۵)

$\cot\alpha = \frac{2}{x}$ ✓ $\quad \cot 2\alpha = \frac{1-\cot^2\alpha}{2\cot\alpha}$

$\cot 2\alpha = \frac{2}{x}$ ~~$\frac{2}{x}$~~ $\frac{3}{2} \Rightarrow$

$\frac{2}{x} = \frac{\frac{x^2-9}{x^2}}{\frac{4}{x}} \Rightarrow \frac{12}{x} = \frac{x^2-9}{x}$

$\Rightarrow x^2-9 = 12 \Rightarrow x^2-21 = 0 \Rightarrow x = \pm\sqrt{21}$

$\Rightarrow \cot\alpha = \frac{2}{\sqrt{21}} = \frac{\sqrt{3}}{\sqrt{7}}$