نام و نام خانوادگی : امیرحسین خاشعی شماره تکلیف : ۲۷ کلاس : یازدهم پسر B

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$$S = \frac{1}{2} \times 9 \times \sqrt{2} \times \sin\alpha = 45 \Rightarrow \sin\alpha = \frac{\sqrt{2}}{2} \rightarrow \begin{cases} \min \alpha = 45^\circ \\ \max \alpha = 135^\circ \end{cases}$$

$$\frac{135}{45} = 3$$ جواب

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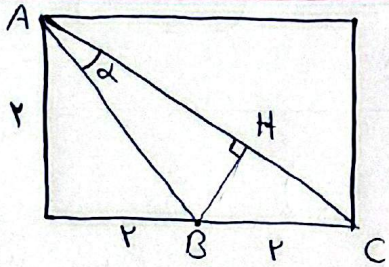

$$AC = \sqrt{2^2 + 4^2} = 2\sqrt{5}$$

روابط طولی : $BC^2 = CH \times AC \Rightarrow 2^2 = CH \times 2\sqrt{5} \Rightarrow CH = \frac{2\sqrt{5}}{5}$

$$AH = AC - CH = 2\sqrt{5} - \frac{2\sqrt{5}}{5} = \frac{8\sqrt{5}}{5} = AH$$

فیثاغورس $\Rightarrow BC^2 - CH^2 = BH^2 \rightarrow 2^2 - \left(\frac{2\sqrt{5}}{5}\right)^2 = \frac{4\sqrt{5}}{5} = BH$

$$\cot\alpha = \frac{AH}{BH} = \frac{\frac{8\sqrt{5}}{5}}{\frac{4\sqrt{5}}{5}} = 2$$ جواب

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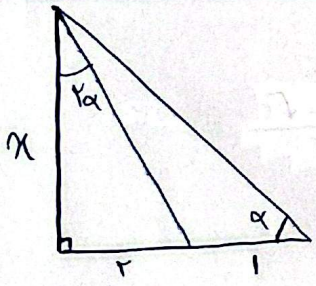

$$\tan\alpha = \frac{x}{2} \qquad \tan 2\alpha = \frac{2\tan\alpha}{1-\tan^2\alpha}$$

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

$$\frac{\frac{2x}{2}}{1-\frac{x^2}{4}} = \frac{2}{x} \rightarrow \frac{\frac{2x}{2}}{\frac{4-x^2}{4}} = \frac{4x}{4-x^2} = \frac{2}{x} \Rightarrow 4x^2 = 8 - 2x^2$$

$$8x^2 = 8 \rightarrow 6x^2 = 4 \rightarrow x^2 = \frac{4}{6} \rightarrow x = \frac{2}{2}$$

$$\cot\alpha = \frac{3}{x} = \frac{3}{\frac{2}{2}} = 3$$ جواب

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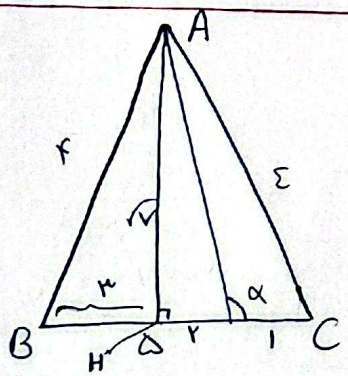

$$AH = \sqrt{4^2 - 3^2} = \sqrt{7}$$

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

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

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$$2\sin^2\alpha + \cos^2\alpha = \frac{4}{3} \rightarrow 1 + \sin^2\alpha = \frac{4}{3} \rightarrow \sin^2\alpha = \frac{1}{3}$$

$$1 + \cot^2\alpha = \frac{1}{\sin^2\alpha} \Rightarrow 3 - 1 = \cot^2\alpha \rightarrow \cot^2\alpha = 2 \Rightarrow \frac{1}{\tan^2\alpha} = 2 \Rightarrow$$

جواب

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

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

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

$$= \cos 2\alpha$$ ← جواب

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$$\underbrace{\sin\left(\frac{9\pi}{2}+\alpha\right)}_{-\cos\alpha}\underbrace{\cos\left(\frac{7\pi}{2}-\alpha\right)}_{-\sin\alpha} - \underbrace{\tan\left(\alpha-\frac{3\pi}{2}\right)}_{+\cot\alpha} = \left(\frac{-3}{5}\times\frac{-4}{3}\right)+\frac{4}{3}$$

$$\frac{12}{25}+\frac{4}{3} = \frac{36+100}{75} = \frac{136}{75}$$ ← جواب

$$\tan\alpha' = \frac{4}{3} \rightarrow$$ (3, 4, 5)

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

$$3\cos 4x + \sqrt{2}\sin x - \sqrt{2}\cos x$$

$$3\cos\frac{\pi}{3} + \sqrt{2}(\sin x - \cos x) \rightarrow \frac{3}{2} + 2\times\frac{-1}{2} = \frac{1}{2}$$ ← جواب

$$\sqrt{2}\left(\sqrt{2}\sin\left(\frac{\pi}{12}-\frac{\pi}{4}\right)\right) = 2\sin\left(-\frac{\pi}{6}\right)$$

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$$\frac{\tan\alpha - \sin\alpha}{\sin\alpha - \cos\alpha} = ?$$

$$\tan\frac{\alpha}{2} = \frac{1}{4}$$

$$\sin\alpha = \frac{2\tan\frac{\alpha}{2}}{1+\tan^2\frac{\alpha}{2}} = \frac{8}{17}$$

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

$$\tan\alpha = \frac{8}{15}$$

$$\frac{\frac{8}{15}-\frac{8}{17}}{\frac{8}{17}-\frac{15}{17}} = \frac{\frac{136-120}{255}}{\frac{8-15}{17}} = \frac{\frac{16}{255}}{\frac{-7}{17}} = \frac{16}{15\times 17}\times\frac{17}{-7} = \frac{16}{-105}$$ ← جواب

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$$2\sin\alpha < \sin 2\alpha$$

$$\sin 2\alpha - 2\sin\alpha > 0$$

$$2\sin\alpha\cos\alpha - 2\sin\alpha > 0$$

$$2\sin\alpha(\cos\alpha - 1) > 0$$

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

$\cos\alpha < 1$ ← غیر قابل

$\cos\alpha < 1$ ← شرط اینکه به این شکل شود این است که $\sin\alpha$ ...

$\sin\alpha > 0$

$\cos\alpha > 0$

ناحیه جواب ← جواب