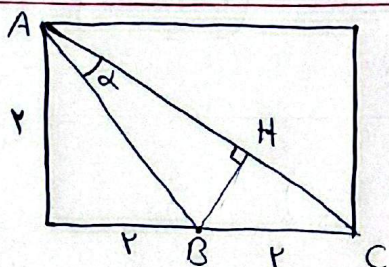


$$S = \frac{1}{2} \times 4 \times \sqrt{3} \times \sin \alpha = 6\delta \Rightarrow \sin \alpha = \frac{\sqrt{3}}{2} \rightarrow \begin{matrix} \min \alpha = 40^\circ \\ \max \alpha = 120^\circ \end{matrix}$$

(۲) (۱)  
 $\frac{120}{60} = \frac{2}{1}$   
 جواب



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

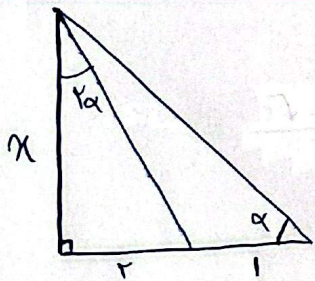
برای قدرت ها قائم الزاویه است فقط!

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

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

فیناغوس  $\Rightarrow BC^2 - CH^2 = BH^2 \Rightarrow 2^2 - \left(\frac{2\sqrt{2}}{2}\right)^2 = \frac{2\sqrt{2}}{2} = BH$

$$\cot \alpha = \frac{AH}{BH} = \frac{\frac{2\sqrt{2}}{2}}{\frac{2\sqrt{2}}{2}} = 1 \rightarrow \text{جواب}$$



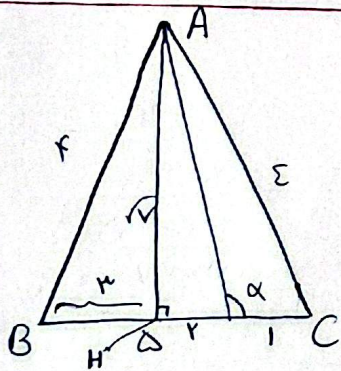
$$\tan \alpha = \frac{x}{1} \quad \tan \alpha = \frac{1 \tan \alpha}{1 - \tan^2 \alpha}$$

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

$$\frac{\frac{x}{1}}{1 - \frac{x^2}{1}} = \frac{x}{1} \rightarrow \frac{\frac{x}{1}}{\frac{1-x^2}{1}} = \frac{x}{1} \Rightarrow \frac{x}{1-x^2} = \frac{x}{1} \Rightarrow 1-x^2 = 1 \Rightarrow x^2 = 0 \Rightarrow x = 0$$

$$1-x^2 = 1 \Rightarrow x^2 = 0 \Rightarrow x = 0$$

$$\cot \alpha = \frac{1}{x} = \frac{1}{\frac{1}{2}} = 2 \rightarrow \text{جواب}$$



$$AH = \sqrt{2^2 - 1^2} = \sqrt{3}$$

$$\tan(\pi - \alpha) = \frac{\sqrt{3}}{1}$$

$$\tan \alpha = \frac{-\sqrt{3}}{1} \rightarrow \text{جواب}$$

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

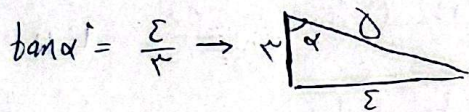
$$1 + \cot^2 \alpha = \frac{1}{\sin^2 \alpha} \Rightarrow 3 - 1 = \cot^2 \alpha \rightarrow \cot^2 \alpha = 2 \Rightarrow \frac{1}{\tan^2 \alpha} = 2 \Rightarrow \tan^2 \alpha = \frac{1}{2} \rightarrow \tan \alpha = \frac{1}{\sqrt{2}} \rightarrow \text{جواب}$$

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

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

جواب  $\boxed{\cos 2\alpha}$

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



$$\frac{12}{5} + \frac{\Sigma}{4} = \frac{24 + 10}{20} = \frac{34}{20} = \frac{17}{10}$$

جواب  $\boxed{0.27}$

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

$$2 \cos \Sigma \alpha + \sqrt{2} \sin \alpha - \sqrt{2} \cos \alpha$$

$$\downarrow$$

$$2 \cos \frac{\pi}{12} + \sqrt{2} (\sin \alpha - \cos \alpha) \rightarrow \frac{2}{2} + \sqrt{2} \times \frac{-1}{\sqrt{2}} = \frac{1}{2}$$

جواب  $\boxed{\frac{1}{2}}$

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

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

$\frac{\tan \alpha - \sin \alpha}{\sin \alpha - \cos \alpha} = 2$

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

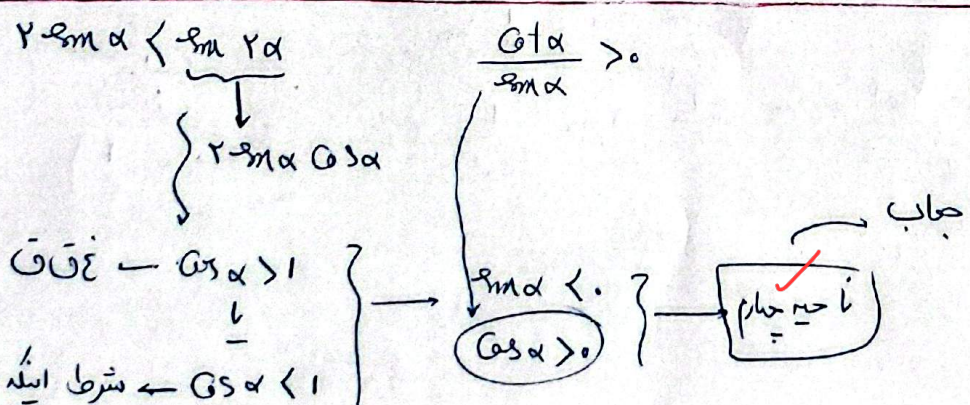
$$\cos \alpha = \sqrt{1 - \sin^2} = \frac{18}{17}$$

$\tan \alpha = \frac{1}{18}$

$$\frac{\frac{1}{18} - \frac{1}{17}}{\frac{1}{17} - \frac{18}{17}} = \frac{17 - 18}{17 \times 18} = \frac{-1}{18}$$

$$\frac{\frac{14}{18} - \frac{18}{17}}{-\frac{119}{17}} = \frac{14 - 18}{-119} = \frac{-4}{-119} = \frac{4}{119}$$

جواب  $\boxed{\frac{-14}{108}}$



$$\tan\left(\alpha + \frac{\pi}{4}\right) = \frac{\tan\alpha + 1}{1 - \tan\alpha} = r \rightarrow \tan\alpha + 1 = r - r\tan\alpha \quad -r$$

$$r\tan\alpha = 1 - \tan\alpha \rightarrow \tan\alpha = \frac{1}{r} \rightarrow \cot\alpha = r$$

