

$$\tan \frac{3\pi}{4} + \sin \frac{V\pi}{4} \cdot \cos \frac{\omega\pi}{4} = \tan 135^\circ + \sin 45^\circ \cdot \cos 45^\circ = \text{الف} \quad (2)$$

$$-1 + \left(-\frac{\sqrt{2}}{2}\right) \times \left(-\frac{\sqrt{2}}{2}\right) = -1 + \frac{1}{2} = -\frac{1}{2} \quad \checkmark$$

$$\tan \frac{\omega\pi}{4} \cdot \sin \frac{\omega\pi}{4} + \cos \frac{3\pi}{4} = \tan 45^\circ \cdot \sin 45^\circ + \cos 135^\circ = -\frac{\sqrt{2}}{2} \times \left(-\frac{\sqrt{2}}{2}\right) - \frac{1}{2} = \text{ب}$$

$$\frac{1}{2} - \frac{1}{2} = 0 \quad \checkmark$$

$$\cot^2 x + 1 = \frac{1}{\sin^2 x} \Rightarrow 4 + 1 = \frac{1}{\sin^2 x} \Rightarrow \sin^2 x = \frac{1}{5} \Rightarrow \sin x = \pm \frac{\sqrt{5}}{5}$$

$$\sin^2 x + \cos^2 x = 1 \Rightarrow \cos^2 x = 1 - \sin^2 x = 1 - \frac{1}{5} = \frac{4}{5} \Rightarrow \cos x = \pm \frac{2\sqrt{5}}{5}$$

$\cos x = 4 \sin x \iff \cos x \text{ و } \sin x < 0 \text{ یا } \cos x \text{ و } \sin x > 0 \text{ یا } \leftarrow \cot x > 0$

$$\frac{4\cos x - \sin x}{\cos x + \sin x} = \frac{4\sin x - \sin x}{4\sin x + \sin x} = \frac{3\sin x}{5\sin x} = \frac{3}{5} \quad \checkmark$$

$$\sin^2 \alpha + \cos^2 \alpha = 1 \Rightarrow \underbrace{4\cos^2 \alpha + \cos^2 \alpha}_{5\cos^2 \alpha} = 1 \Rightarrow \cos^2 \alpha = \frac{1}{5} \xrightarrow{\cos \alpha < 0} \cos \alpha = -\frac{\sqrt{5}}{5} \quad (2)$$

$$\cos^2 \alpha = 1 - \sin^2 \alpha = 1 - \frac{9}{100} = \frac{91}{100} \Rightarrow \cos \alpha = \frac{91}{100} \quad \text{الف} \quad (2)$$

$$\cos 135^\circ \cdot \cos \alpha - \sin 135^\circ \cdot \sin \alpha = -\frac{\sqrt{2}}{2} \times \frac{91}{100} - \frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2} = \frac{14}{100} - \frac{1}{100} = \frac{13}{100} = \frac{13}{1000} \quad \checkmark$$

$$\tan^2 \alpha + 1 = \frac{1}{\cos^2 \alpha} \Rightarrow \frac{49}{81} = \frac{1}{\cos^2 \alpha} \Rightarrow \cos \alpha = \frac{9}{7} \quad \text{ب}$$

$$\sin 45^\circ \cdot \cos \alpha + \sin \alpha \cdot \cos 45^\circ = -\frac{\sqrt{2}}{2} \times \frac{9}{7} + \frac{\sqrt{2}}{2} \times \left(-\frac{\sqrt{2}}{2}\right) = -\frac{14}{70} - \frac{1}{70} = -\frac{15}{70} = -\frac{3}{14} \quad \checkmark$$

$$\sin^2 x + \underbrace{\sin^2 x + \cos^2 x}_{1} = \frac{4}{9} \Rightarrow \sin^2 x = \frac{1}{9} \Rightarrow \sin x = \pm \frac{1}{3}$$

$$\cos^2 x = 1 - \sin^2 x = 1 - \frac{1}{9} = \frac{8}{9} \quad \tan^2 x + 1 = \frac{1}{\cos^2 x} \Rightarrow \tan^2 x = \frac{1}{8} - 1 \Rightarrow \tan^2 x = \frac{1}{8} - 1 = -\frac{7}{8} \quad \checkmark$$

$$S_{ABC} = \frac{1}{\sqrt{2}} ab \cdot \sin \alpha \Rightarrow F/\omega = \frac{1}{\sqrt{2}} \sqrt{2} \times 4 \times \sin \alpha \Rightarrow \sin \alpha = \frac{F/\omega}{4\sqrt{2}} =$$

$$\sin \alpha = \frac{\frac{\sqrt{2}}{2}}{4\sqrt{2}} = \frac{\sqrt{2}}{8\sqrt{2}} = \frac{1}{4} \rightarrow \alpha = 4^\circ \rightarrow \min \alpha$$

$$\alpha = 14^\circ \rightarrow \max \alpha$$

$$\frac{\max \alpha}{\min \alpha} = \frac{14^\circ}{4^\circ} = \boxed{7} \checkmark$$

$$S_{\text{موازی الاضلاع}} = ab \cdot \sin \alpha \rightarrow \omega F = 2x \cdot 3x \cdot \sin 10^\circ = 4x^2 \cdot \frac{1}{4} \Rightarrow$$

$$3x^2 = \omega F \Rightarrow x^2 = 11 \xrightarrow{x > 0} x = \sqrt{11} = \frac{3\sqrt{2}}{2}$$

$$a = 2x = 4\sqrt{2}$$

$$b = 3x = 9\sqrt{2}$$

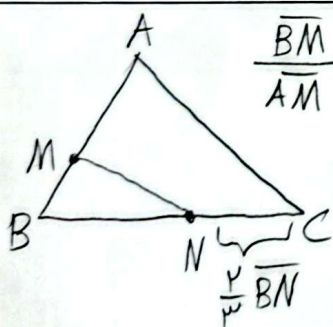
$$P_{\text{موازی الاضلاع}} = 2(a+b) = 2(4\sqrt{2} + 9\sqrt{2}) = \boxed{26\sqrt{2}} \checkmark$$

$$1/\omega = S_{ABC} - S_{ADE} = \frac{1}{\sqrt{2}} AB \cdot AC \cdot \sin \hat{A} - \frac{1}{\sqrt{2}} AE \cdot AD \cdot \sin \hat{A} \Rightarrow$$

$$1/\omega = \frac{1}{\sqrt{2}} \times \omega \times \sqrt{2} \times \sin \hat{A} - \frac{1}{\sqrt{2}} \times F \times \sqrt{2} \times \sin \hat{A} \Rightarrow 1/\omega = \sqrt{2} \sin \hat{A} \Rightarrow \sin \hat{A} = \frac{1}{\sqrt{2}}$$

$$\tan 45^\circ = \boxed{\frac{\sqrt{2}}{2}}$$

$$\tan \hat{A} = \tan 45^\circ = \sqrt{2}$$



$$\frac{BM}{AM} = ?$$

$$2BN = 3NC \Rightarrow NC = \frac{2}{3}BN$$

$$\omega = \frac{S_{ABC}}{S_{BMN}} = \frac{\frac{1}{\sqrt{2}} AB \cdot BC \cdot \sin \hat{B}}{\frac{1}{\sqrt{2}} \cdot BM \cdot BN \cdot \sin \hat{B}} \Rightarrow \omega = \frac{(AM+BM) \cdot \frac{2}{3}BN}{BM \cdot BN} \Rightarrow$$

$$\omega BM = \frac{2}{3} AM + \frac{2}{3} BM \Rightarrow \frac{F}{\sqrt{2}} BM = \frac{2}{3} AM \Rightarrow \frac{BM}{AM} = \frac{2}{F} \checkmark$$

$$\frac{1}{\sqrt{\cos \alpha}} - \tan \alpha = \frac{1 + \sin \alpha}{|\cos \alpha|} \Rightarrow \frac{1}{|\cos \alpha|} - \tan \alpha = \frac{1}{|\cos \alpha|} + \frac{\sin \alpha}{|\cos \alpha|} \Rightarrow -\tan \alpha = \frac{\sin \alpha}{|\cos \alpha|}$$

$$\frac{|\sin \alpha|}{\cos \alpha} = -\frac{1}{\cot \alpha} = -\tan \alpha \quad ②$$

$$① \wedge ② \Rightarrow -\tan \alpha = \frac{|\sin \alpha|}{\cos \alpha} = \frac{\sin \alpha}{|\cos \alpha|}$$

$$\left\{ \begin{array}{l} -\frac{\sin \alpha}{\cos \alpha} = \frac{|\sin \alpha|}{\cos \alpha} \Rightarrow \sin \alpha < 0 \\ -\frac{\sin \alpha}{\cos \alpha} = \frac{\sin \alpha}{|\cos \alpha|} \Rightarrow \cos \alpha < 0 \end{array} \right. \Rightarrow \text{انتها كان } \alpha \text{ در ربع سوم است}$$