

$$\text{الف) } \tan\left(\frac{3\pi}{4}\right) + \sin\left(\frac{\sqrt{2}\pi}{4}\right) \cos\left(\frac{\pi}{4}\right) = -1 + \frac{1}{\sqrt{2}} = -\frac{1}{\sqrt{2}}$$

$$\text{ب) } \frac{\tan\left(\frac{\pi}{4}\right)}{\tan 15^\circ} \frac{\sin\left(\frac{\pi}{4}\right)}{\sin 30^\circ} + \cos\left(\frac{\pi}{4}\right) = \frac{-\frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2}}{\frac{1}{2}} + \left(-\frac{1}{\sqrt{2}}\right) = \frac{1}{2} - \frac{1}{\sqrt{2}} = 0$$

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$$\frac{\sqrt{2}\cos\alpha - \sin\alpha}{\cos\alpha + \sin\alpha} \xrightarrow{\div \sin\alpha} \frac{\sqrt{2}\cot\alpha - 1}{\cot\alpha + 1} = \frac{\sqrt{2} - 1}{\sqrt{2} + 1} = \frac{1}{\sqrt{2}} = \frac{1}{2}$$

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$$\sin^2\alpha + \cos^2\alpha = 1 \rightarrow (\sqrt{2}\cos\alpha)^2 + \cos^2\alpha = 1 \rightarrow 2\cos^2\alpha + \cos^2\alpha = 1$$

$$\cos^2\alpha = \frac{1}{3} \rightarrow \cos\alpha = \pm \frac{1}{\sqrt{3}} \rightarrow \begin{cases} \cos\alpha = \frac{1}{\sqrt{3}} \\ \cos\alpha = -\frac{1}{\sqrt{3}} = -\frac{\sqrt{3}}{3} \end{cases}$$

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$$\text{ان) } \cos\alpha = \sqrt{1 - \sin^2\alpha} \Rightarrow \sqrt{1 - \left(\frac{\sqrt{2}}{2}\right)^2} = \sqrt{\frac{2}{2}} = \frac{\sqrt{2}}{2} \Rightarrow \cos\left(\frac{11\pi}{12} + \alpha\right) = \cos\frac{11\pi}{12}\cos\alpha - \sin\frac{11\pi}{12}\sin\alpha \\ \Rightarrow \frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2} - \left(\frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2}\right) = \frac{1}{2} - \frac{1}{2} = 0 = \frac{0}{2}$$

$$\text{ب) } \sin\left(\frac{\pi}{4} + \alpha\right) = \sin\frac{\pi}{4}\cos\alpha + \sin\alpha\cos\frac{\pi}{4} \rightarrow \frac{\sqrt{2}}{2} \times \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}} \times \frac{\sqrt{2}}{2} = \frac{1}{2} + \frac{1}{2} = 1$$

$$1 + \tan^2\alpha = \frac{1}{\cos^2\alpha} \rightarrow \cos = \frac{1}{\sqrt{2}} \quad \sin = \sqrt{1 - \cos^2} = \frac{1}{\sqrt{2}}$$

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$$\cos^2\alpha = 1 - \sin^2\alpha$$

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

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

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$$\sum F_x = \frac{1}{r} \times 4 \times \sqrt{3} \times \sin \alpha = f \omega$$

$$r \sqrt{3} \sin \alpha = f \omega \rightarrow \sin \alpha = \frac{f \omega}{r \sqrt{3}} = \frac{f \omega r}{a} \cdot \frac{\sqrt{3}}{r} \therefore \begin{matrix} 4.^\circ \\ 11.^\circ \end{matrix}$$

$$\frac{11.^\circ}{4.^\circ} = \boxed{r \cdot f \cdot \omega}$$

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$$\left(\frac{1}{r} \times r \times r \times \frac{\sin 4.0^\circ}{r} \right) \times r = d f \Rightarrow 4 r^2 \times \frac{1}{r} = d f \Rightarrow 4 r^2 = 1.0 \rightarrow r^2 = 1/4$$

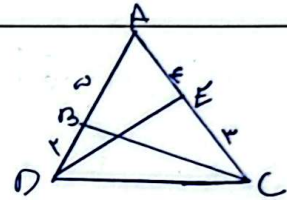
$$\hookrightarrow r = \pm \sqrt{1/4}$$

$$P = (r \sqrt{1/4} + r \sqrt{1/4}) \times r = \boxed{1.0 \sqrt{1/4}}$$

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$$S_{ABC} = \frac{1}{2} \times a \times v \times \sin \hat{A} = \frac{r a}{2} \sin \hat{A} = 1/2 a \sin \hat{A}$$

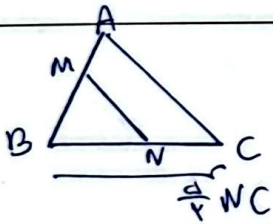
$$S_{ADE} = \frac{1}{2} \times x \times v \times \sin \hat{A} = 1/2 x \sin \hat{A}$$



$$1/2 a \sin \hat{A} - 1/2 x \sin \hat{A} = 1/2 v \rightarrow r \sin \hat{A} = 1/2 v \rightarrow \sin \hat{A} = 1/2 v = \frac{1}{2} \rightarrow \text{circles} \rightarrow A = 30^\circ$$

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$$\rightarrow \tan 30^\circ = \frac{1}{r v} = \boxed{\frac{\sqrt{3}}{v}}$$



$$r BN = r NC \rightarrow BN = r NC \rightarrow \frac{r}{r} NC + NC = \frac{a}{r} NC$$

$$S_{ABC} = \frac{1}{2} \times \frac{a}{r} NC \times AB \times \sin \hat{B} = r \left(\frac{1}{2} \times \frac{a}{r} NC \times MB \times \sin \hat{B} \right)$$

$$\frac{a}{r} NC \times \frac{AB}{AM+MB} \times \sin \hat{B} = \frac{a}{r} NC \times MB \times \sin \hat{B} \quad S_{BMN}$$

$$\Rightarrow \frac{a}{r} AM + \frac{a}{r} MB = \frac{a}{r} MB \rightarrow \frac{a}{r} AM = MB \Rightarrow \boxed{\frac{BM}{AM} = \frac{a}{r}}$$

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$$\frac{|\sin \alpha|}{\cos \alpha} = -\frac{1}{\cot \alpha} \rightarrow \frac{|\sin \alpha|}{\cos \alpha} = -\frac{\sin \alpha}{\cos \alpha} \Rightarrow |\sin \alpha| = -\sin \alpha \rightarrow \sin \alpha < 0$$

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

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$$\Rightarrow \sin \alpha < 0, \cos \alpha < 0 \Rightarrow \text{third quadrant}$$