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$$m(\cos x - \sin x) - \sqrt{4} \sin 2x = \sqrt{4} \rightarrow m(-\sqrt{2} \sin(x + \frac{3\pi}{4})) - \sqrt{4} \sin 2x = \sqrt{4} \quad \textcircled{2}$$

$$\frac{a}{|a|} \sqrt{a^2 + b^2} \sin(x + \alpha)$$

$$\alpha \Rightarrow \tan \alpha = \frac{b}{a}$$

$$\rightarrow -\sqrt{2}m \sin(x + \frac{3\pi}{4}) - \sqrt{4} \sin 2x = \sqrt{4} \xrightarrow{\div -\sqrt{2}} m \sin(x + \frac{3\pi}{4}) + \sqrt{2} \sin 2x = -\sqrt{2}$$

$$\frac{\sqrt{2}}{2} (C \cdot \sin x - \sin x) = \frac{\sqrt{2}}{2}$$

1, 8

$$\cos(-x - \frac{\pi}{4}) = \frac{1}{\sqrt{2}}$$

$$\frac{-x - \frac{\pi}{4}}{2\pi} = \frac{x + \frac{\pi}{4}}{2\pi}$$

$$\frac{\sqrt{2}}{2}m + \sqrt{2} \sin 2x = -\sqrt{2} \rightarrow \frac{1}{2}m + \sin 2x = -1 \rightarrow \frac{1}{2}m = -1 - \sin 2x$$

$$C \cdot \sin x - \sin x = \frac{\sqrt{2}}{2}$$

$$(C \cdot \sin x - \sin x)^2 = (\frac{\sqrt{2}}{2})^2 \rightarrow C^2 \sin^2 x + \sin^2 x - 2 \sin x C \cdot \sin x = \frac{1}{2}$$

$$\sin^2 x = \frac{1}{2}$$

$$\cos(x - \frac{\pi}{4}) \rightarrow \cos(\frac{\pi}{4} - x) \rightarrow \sin(\frac{\pi}{4} + x)$$

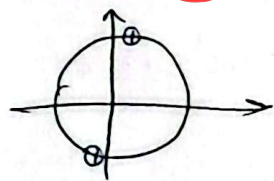
$$m \times \frac{\sqrt{2}}{2} - \sqrt{4} \times \frac{1}{2} = \sqrt{4} \Rightarrow m = 4$$

$$\rightarrow \sin(\frac{\pi}{4} + x) = 1$$

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$$\begin{cases} \sin(x + \frac{\pi}{4}) = 1 \rightarrow x + \frac{\pi}{4} = 2k\pi + \frac{\pi}{2} \rightarrow x = 2k\pi + \frac{\pi}{4} \\ \sin(x + \frac{\pi}{4}) = -1 \rightarrow x + \frac{\pi}{4} = 2k\pi + \frac{3\pi}{2} \rightarrow x = 2k\pi + \frac{5\pi}{4} \end{cases}$$

$$\begin{cases} x = 2k\pi + \frac{\pi}{4} \\ x = 2k\pi + \frac{5\pi}{4} \end{cases}$$



بشكل عام :

$$a \sin x + b \cos x \rightarrow \frac{a}{|a|} \sqrt{a^2 + b^2} \sin(x + \alpha) \quad \tan \alpha = \frac{b}{a}$$

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$$\rightarrow \sin x + \sqrt{2} \cos x \rightarrow \sqrt{3} \sin(x + \frac{\pi}{6}) \Rightarrow \sqrt{3} \sin(x + \frac{\pi}{6}) = \sqrt{3}$$

$$\rightarrow \sin(x + \frac{\pi}{6}) = \sin \frac{\pi}{6} \rightarrow x + \frac{\pi}{6} = 2k\pi + \frac{\pi}{6} \rightarrow x = 2k\pi - \frac{\pi}{12}$$

$$x + \frac{\pi}{6} = 2k\pi + \frac{5\pi}{6} \rightarrow x = 2k\pi + \frac{2\pi}{3}$$

$$\rightarrow -\frac{\pi}{12}, \frac{2\pi}{3}, \frac{17\pi}{12} \rightarrow \frac{15\pi}{12} = \frac{5\pi}{4}$$

1, 8

$$-\frac{\pi}{12}, \frac{2\pi}{3}, \frac{17\pi}{12} = \frac{15\pi}{12} = \frac{5\pi}{4}$$

$$f \sin x \sin(\frac{2\pi}{3} - x) = 1 \rightarrow -f \sin x \cos x = 1 \rightarrow -f \sin 2x = 1 \rightarrow \sin 2x = -\frac{1}{f}$$

$$-\cos x$$

1, 8

$$2x = 2k\pi + \frac{3\pi}{2} \rightarrow x = k\pi + \frac{3\pi}{4} \rightarrow \frac{3\pi}{4}, \frac{7\pi}{4}$$

$$\rightarrow \sin 2x = \sin \frac{3\pi}{4} \rightarrow 2x = 2k\pi + \frac{3\pi}{4} \rightarrow x = k\pi + \frac{3\pi}{8} \rightarrow \frac{3\pi}{8}, \frac{11\pi}{8}$$

$$2x = 2k\pi - \frac{\pi}{4} \rightarrow x = k\pi - \frac{\pi}{8} \rightarrow \frac{7\pi}{8}, \frac{15\pi}{8}$$

$$\cos \psi \rightarrow \cos \psi = \frac{1 + \cos \psi}{2}$$

$$\begin{aligned} 1 + \cos \psi &\rightarrow 2 \cos^2 \frac{\psi}{2} \\ 1 + \cos \psi &\rightarrow 2 \cos^2 \frac{\psi}{2} \\ 1 + \cos \psi &\rightarrow 2 \cos^2 \frac{\psi}{2} \end{aligned} \quad \left\{ \begin{aligned} &\rightarrow 1 (\cos \psi \cdot \cos \psi \cdot \cos \psi) = \frac{1}{\lambda} \end{aligned} \right.$$

$$\cos \psi \cdot \cos \psi \cdot \cos \psi = \frac{1}{\lambda} \rightarrow \frac{\sin \psi}{\sin \alpha} \rightarrow \frac{1}{\lambda} \frac{\sin \lambda \alpha}{\sin \alpha}$$

$$\rightarrow 1 \left(\frac{1}{\lambda} \frac{\sin \lambda \alpha}{\sin \alpha} \right) = \frac{1}{\lambda} \Rightarrow \frac{\sin \lambda \alpha}{\sin^2 \alpha} = 1 \rightarrow \frac{\sin \lambda \alpha}{\sin \alpha} = \pm 1$$

$$\begin{aligned} \sin \lambda \alpha = \sin \alpha &\rightarrow \lambda \alpha = 2k\pi + \alpha \rightarrow \alpha = \frac{2k\pi}{\lambda} \\ \lambda \alpha = 2k\pi + \pi - \alpha &\rightarrow \alpha = \frac{2k\pi}{\lambda} \end{aligned}$$

$$\sin \lambda \alpha = -\sin \alpha \rightarrow \sin \lambda \alpha = \sin(-\alpha) \rightarrow \lambda \alpha = 2k\pi - \alpha \rightarrow \alpha = \frac{2k\pi}{\lambda}$$

$$\lambda \alpha = 2k\pi + \pi + \alpha \rightarrow \alpha = \frac{2k\pi}{\lambda} + \frac{\pi}{\lambda}$$

$$\rightarrow \boxed{\frac{\pi}{9}}$$

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

$$\tan \psi = \cot \alpha \rightarrow \tan \left(\frac{\pi}{9} \right)$$

$$\psi = k\pi + \frac{\pi}{9} \rightarrow \boxed{\alpha = \frac{k\pi}{9} + \frac{\pi}{9}} \rightarrow \frac{2\pi}{9} \rightarrow \frac{\sqrt{\pi}}{9} \Rightarrow \boxed{3\pi}$$

$$\begin{aligned} k=8 & \quad k=7 & \quad k=6 & \quad k=5 \\ \frac{8\pi}{9} & + \frac{7\pi}{9} & + \frac{6\pi}{9} & + \frac{5\pi}{9} = 4\pi \end{aligned}$$