

صفر عالی و نامم نوشتن

$$1 \cos x - \tan x = 1 \Rightarrow 1 \cos x = 1 + \tan x \Rightarrow 1 \cos x = \frac{1}{\cos x} \Rightarrow 1 \cos^2 x = 1 \quad (1)$$

$$\Rightarrow \cos^2 x = \frac{1}{1} \Rightarrow \cos x = \frac{1}{1} \Rightarrow x = \frac{\pi}{2} \text{ و } \frac{3\pi}{2} \Rightarrow \boxed{\text{دو باره صفر جواب دارد}}$$

$$5 \sin^2 x + 2 \cos^2 x + 2 = 0 \Rightarrow 5 \sin^2 x + 2 \cos^2 \left(\frac{3\pi}{2}\right) = 0 \Rightarrow \text{جمع دو عبارت دهوار}$$

$$5 \sin^2 x = 0 \Rightarrow \sin x = 0 \Rightarrow \text{نقطه صفر صفر است} \Rightarrow \text{هر دو صفر هستند}$$

$$\Rightarrow x = k\pi \quad [-\pi, \pi] \text{ جواب } \Rightarrow x = (-\pi) \text{ و } 0 \text{ و } \pi \quad (1)$$

$$2 \cos^2 \left(\frac{3\pi}{2}\right) = 0 \Rightarrow \cos^2 \frac{3\pi}{2} = 0 \Rightarrow \frac{3\pi}{2} = k\pi + \frac{\pi}{2} \Rightarrow x = \frac{2k\pi}{3} + \frac{\pi}{3} \quad (2)$$

$$(1) \cap (2) \Rightarrow x = (-\pi) \text{ و } \pi \Rightarrow \boxed{\text{دو باره جواب دارد}}$$

$$2 \sin x \cos^2 x + \sin x - 1 = 0 \Rightarrow 2 \sin x (1 - \sin^2 x) + \sin x - 1 = 0 \quad (3)$$

$$\Rightarrow 2 \sin^3 x - \sin^3 x - 1 = 0 \Rightarrow \sin^3 x - \sin x + 1 = 0$$

$$\Rightarrow (\sin x + 1)(\sin^2 x - \sin x + 1) = 0$$

$$\Rightarrow \left\{ \begin{array}{l} \sin x = -1 \Rightarrow x = \frac{3\pi}{2} \\ (2 \sin^2 x - 1)^2 = 0 \Rightarrow \sin x = \frac{1}{2} \Rightarrow x = \frac{\pi}{6} \text{ و } \frac{5\pi}{6} \end{array} \right\} \Rightarrow \frac{3\pi}{2} + \frac{\pi}{6} + \frac{5\pi}{6} = \frac{5\pi}{2}$$

$$\sin\left(\frac{\pi}{6} + 2\pi\right) = -\cos\left(\frac{\pi}{6} + 2\pi\right) \Rightarrow \cos 2\pi = \sin 2\pi \Rightarrow \text{با هم به صورت سوال}$$

چون این دو در خارج قرار دارند $\sin 2\pi$ و $\cos 2\pi$ نمی توانست صفر باشند.

$$\Rightarrow \sin 2\pi - \cos 2\pi = 0 \Rightarrow 2 \sin^2 \pi (\cos \pi - \cos \pi) = 0 \Rightarrow \cos \pi (2 \sin^2 \pi - 1) = 0$$

$$\Rightarrow \left\{ \begin{array}{l} \cos \pi = 0 \text{ } \times \text{ غلط} \\ \sin^2 \pi = \frac{1}{2} \end{array} \right.$$

$$\sin \pi = \frac{1}{2} \quad [-\pi, \pi] \text{ جواب } \Rightarrow \pi = \frac{\pi}{6} \text{ و } \frac{5\pi}{6} \Rightarrow x = \frac{\pi}{12} \text{ و } \frac{5\pi}{12}$$

$$\Rightarrow \alpha = \frac{5\pi}{12} - \frac{\pi}{12} = \frac{4\pi}{12} = \frac{\pi}{3} \Rightarrow \tan \alpha = \tan \frac{\pi}{3} = -\sqrt{3}$$

$$\cos\left(n + \frac{\pi}{4}\right) = \cos n \cos \frac{\pi}{4} - \sin n \sin \frac{\pi}{4} = \frac{\sqrt{2}}{2} \cos n - \frac{\sqrt{2}}{2} \sin n \quad (3)$$

$$= \frac{\sqrt{2}}{2} (\cos n - \sin n) = \frac{1}{\sqrt{2}} \Rightarrow \cos n - \sin n = \frac{\sqrt{2}}{\sqrt{2}}$$

$$2 \cos^2 n, \sin^2 n + \cos^2 n - 2 \sin n \cos n = \frac{2}{2} \Rightarrow 1 - \sin 2n = \frac{2}{2} \quad (4)$$

$$\Rightarrow \sin 2n = \frac{1}{2} \Rightarrow m(\cos n - \sin n) - \sqrt{2} \sin(2n) = \sqrt{2}$$

$$\Rightarrow m\left(\frac{\sqrt{2}}{\sqrt{2}}\right) - \sqrt{2}\left(\frac{1}{2}\right) = \sqrt{2} \Rightarrow \frac{m\sqrt{2}}{2} = 2\sqrt{2} \Rightarrow \underline{m=4}$$

$$\sin\left(n + \frac{\pi}{4}\right) \cos\left(\frac{\pi}{4} - n\right) = 1 \Rightarrow \sin\left(n + \frac{\pi}{4}\right) \times \sin\left(n + \frac{\pi}{4}\right) = 1 \quad (5)$$

$$\Rightarrow \sin^2\left(n + \frac{\pi}{4}\right) = 1 \Rightarrow \sin\left(n + \frac{\pi}{4}\right) = \pm 1 \Rightarrow n + \frac{\pi}{4} = k\pi + \frac{\pi}{4}$$

$$\Rightarrow n = k\pi + \frac{\pi}{4} \Rightarrow \text{Unit Circle} \rightarrow \frac{\pi}{4}, \frac{5\pi}{4} \Rightarrow \text{جواب 2}$$

$$\sqrt{2} = \tan \frac{\pi}{4} \quad (6)$$

$$\sin n + \frac{\sin \frac{\pi}{4}}{\cos \frac{\pi}{4}} \times \cos n = \sqrt{2} \Rightarrow \frac{\sin n \cos \frac{\pi}{4} + \sin \frac{\pi}{4} \cos n}{\cos \frac{\pi}{4}} = \sqrt{2}$$

$$\Rightarrow \sin\left(n + \frac{\pi}{4}\right) = \sqrt{2} \cos \frac{\pi}{4} = \frac{\sqrt{2}}{2} \Rightarrow n + \frac{\pi}{4} = 2k\pi + \frac{\pi}{4}, 2k\pi + \frac{3\pi}{4}$$

$$\Rightarrow n = \frac{-\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4} \Rightarrow \text{جواب 2}$$

$$f \sin n \sin\left(\frac{3\pi}{4} - n\right) = -f \sin n \cos n = -2 \sin 2n = 1 \quad (7)$$

$$\Rightarrow \sin 2n = -\frac{1}{2} = \sin\left(-\frac{\pi}{6}\right) \Rightarrow \begin{cases} 2n = 2k\pi - \frac{\pi}{6} \Rightarrow n = k\pi - \frac{\pi}{12} \\ 2n = 2k\pi + \frac{5\pi}{6} \Rightarrow n = k\pi + \frac{5\pi}{12} \end{cases}$$

$$\text{جواب 2} \Rightarrow \frac{5\pi}{12} + \frac{11\pi}{12} + \frac{19\pi}{12} + \frac{23\pi}{12} = 9\pi$$

