

تلف

کتاب اول

$$\cos x = \frac{1}{r} \sin x - 1 \rightarrow 1 - \frac{1}{r} \sin x = \frac{1}{r} \sin x - 1 \rightarrow \frac{1}{r} \sin x + \frac{1}{r} \sin x - 1 = 0 \rightarrow \sin x = -\frac{r}{2} \quad (1)$$

$$\rightarrow \sin x = \frac{1}{r} \checkmark$$

$$5 \quad \sin x = \sin \frac{\pi}{9} \rightarrow n = \frac{1}{r} \pi + \frac{\pi}{9} \quad k \in \mathbb{Z}$$

$$\rightarrow n = \frac{1}{r} \pi + \frac{\pi}{9}$$

$$\cos x + \cos n - r = 0 \rightarrow r \cos x + \cos n - r = 0$$

$$\rightarrow \cos x = \frac{r}{r} \quad (1)$$

$$\rightarrow \cos x = 1 \checkmark$$

$$10 \quad \cos x = 1$$

$$\cos x = \cos \frac{\pi}{2} \rightarrow n = \frac{1}{r} \pi + \frac{\pi}{2} \Rightarrow n = \frac{1}{r} \pi \quad k \in \mathbb{Z}$$

$$\rightarrow n = \frac{1}{r} \pi - \frac{\pi}{2}$$

$$\sin x - \cos x = \sin x \rightarrow -\cos x = \frac{1}{r} \sin x \cos x \xrightarrow{\cos x \neq 0} \sin x = -\frac{1}{r} \quad (2)$$

$$15 \quad \frac{\sin x}{-\cos x} = \frac{\cos x}{\sin x} \rightarrow \cos x = 0 = \cos \frac{\pi}{2} \rightarrow n = \frac{1}{r} \pi \pm \frac{\pi}{2} \rightarrow n = \frac{1}{r} \pi \pm \frac{\pi}{2}$$

$$\sin x = \frac{1}{r} = \sin \frac{\pi}{2} \rightarrow n = \frac{1}{r} \pi - \frac{\pi}{2} \rightarrow n = \frac{1}{r} \pi - \frac{\pi}{2}$$

$$n = \frac{1}{r} \pi + \frac{\pi}{2} + \frac{\pi}{2} \rightarrow n = \frac{1}{r} \pi + \frac{\pi}{2}$$

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$$r \cos x + \frac{1}{r} \sin x \cos x = 1 \rightarrow \frac{1}{r} \sin x \cos x = 1 - r \cos x \rightarrow \sin x = -\cos x \quad (3)$$

$$\rightarrow \tan x = -1 = \tan \frac{\pi}{2} \rightarrow n = \frac{1}{r} \pi - \frac{\pi}{2} \rightarrow n = \frac{1}{r} \pi - \frac{\pi}{2}$$

$$25 \quad \cot x (r \cos x + 1) = \frac{1}{\sin x} \rightarrow \frac{r \cos x + \cos x}{\sin x} = \frac{1}{\sin x} \quad (4)$$

$$\rightarrow r \cos x + \cos x - 1 = 0 \rightarrow \cos x = -1 \rightarrow n = \frac{1}{r} \pi + \pi$$

$$\rightarrow \cos x = \frac{1}{r} \rightarrow n = \frac{1}{r} \pi \pm \frac{\pi}{2}$$

$$30 \quad \frac{1}{r} \sin x - \sin x \cos x + \cos x = r \rightarrow \frac{1}{r} \sin x - \sin x \cos x = r - \cos x$$

$$1 - \sin^2 x = -\sin x \cos x \rightarrow \cos x = -\sin x \cos x \xrightarrow{\cos x \neq 0} \cos x = -\sin x$$

Parsian

$$n = \frac{1}{r} \pi \pm \frac{\pi}{2}$$

$$n = \frac{1}{r} \pi - \frac{\pi}{2}$$

$$\cos\left(m + \frac{R}{\varepsilon}\right) \cos\left(m - \frac{R}{\varepsilon}\right) = \frac{1}{\varepsilon} \rightarrow \sin\left(m + \frac{R}{\varepsilon}\right) \cos\left(m - \frac{R}{\varepsilon}\right) = \frac{1}{\varepsilon} \quad (6)$$

$= \cos\left(\frac{R}{\varepsilon} - m\right)$

مقام مشترک

$$\frac{1}{\varepsilon} \sin\left(m + \frac{R}{\varepsilon}\right) = \frac{1}{\varepsilon} \rightarrow \sin\left(\frac{R}{\varepsilon} + m\right) = \frac{1}{\varepsilon} \rightarrow \cos m = \frac{1}{\varepsilon}$$

$$m = kR \pm \frac{R}{\varepsilon} \rightarrow n = kR \pm \frac{R}{\varepsilon}$$

$$\cos\left(m - \frac{R}{\varepsilon}\right) = -\sin m \rightarrow \cos\left(m - \frac{R}{\varepsilon}\right) = \cos\left(\frac{R}{\varepsilon} + m\right)$$

$$m - \frac{R}{\varepsilon} = kR + \frac{R}{\varepsilon} + m$$

$$m - \frac{R}{\varepsilon} = kR + \frac{R}{\varepsilon} - m \rightarrow \varepsilon m = kR + \frac{2R}{\varepsilon} \rightarrow m = \frac{kR}{\varepsilon} + \frac{2R}{\varepsilon^2}$$

$$\frac{\sin \varepsilon m + \sin m}{\sin m} - \sin^2 m = \cos^2 m \rightarrow \frac{\sin \varepsilon m + \sin m}{\sin m} = \sin^2 m + \cos^2 m = 1$$

$$\rightarrow \sin \varepsilon m + \sin m = \sin m \rightarrow \sin \varepsilon m = 0 \rightarrow \varepsilon m = kR \rightarrow m = \frac{kR}{\varepsilon}$$

$$\frac{\sin \frac{m}{\varepsilon}}{1 + \cos \frac{m}{\varepsilon}} = \frac{1}{\sin \frac{m}{\varepsilon}} + \cot \frac{m}{\varepsilon} \rightarrow \frac{\sin \frac{m}{\varepsilon}}{1 + \cos \frac{m}{\varepsilon}} = \frac{1 + \cos \frac{m}{\varepsilon}}{\sin \frac{m}{\varepsilon}}$$

$$\frac{\sin^2 \frac{m}{\varepsilon}}{1 + \cos \frac{m}{\varepsilon}} = 1 + \cos \frac{m}{\varepsilon} + \cot \frac{m}{\varepsilon} \rightarrow \frac{\sin^2 \frac{m}{\varepsilon}}{1 + \cos \frac{m}{\varepsilon}} + \cot \frac{m}{\varepsilon} = 0 \rightarrow \cot \frac{m}{\varepsilon} (\cos \frac{m}{\varepsilon} + 1) = 0$$

$$\cos \frac{m}{\varepsilon} = 0 \rightarrow \frac{m}{\varepsilon} = kR + \frac{\pi}{2} \rightarrow m = \varepsilon kR + \frac{\pi}{2} \quad k \in \mathbb{Z} \quad \text{یا } \frac{1}{\varepsilon} = -R, R$$

$$\cos \frac{m}{\varepsilon} = -1 \rightarrow \frac{m}{\varepsilon} = kR + \pi \rightarrow m = \varepsilon kR + \pi$$

$$| -R - \pi | = \pi R$$

$$\cos^2 n - \sin^2 n \cos^2 n = 1 \rightarrow \cancel{\sin^2 n \cos^2 n} = \cancel{1 \cos^2 n} \xrightarrow{\sin^2 n \neq 0} \cos^2 n = -1 \quad (v)$$

$$\sin^2 n = 0 \rightarrow \sin n = 0 \rightarrow n = k\pi$$

$$5 \quad \cos^2 n = -1 \rightarrow n = k\pi + \pi \rightarrow n = \frac{k\pi}{2} + \frac{\pi}{2}$$

$$\hookrightarrow \text{جواب} = 0, \pi, 2\pi, \frac{\pi}{2}, \frac{3\pi}{2}$$

جواب د

$$\frac{1 - \tan n}{1 + \tan n} = \tan^2 n \xrightarrow{\frac{1 - \tan n}{1 + \tan n} = \tan(n - \frac{\pi}{2}) = \cot(n - \frac{\pi}{2})} \cot(n - \frac{\pi}{2}) = \tan^2 n = \cot(\frac{\pi}{2} - n) \quad (1)$$

$$10 \quad n + \frac{\pi}{2} = k\pi + \frac{\pi}{2} - n \rightarrow 2n = k\pi \rightarrow n = \frac{k\pi}{2}$$

~~نکته: اگر $\frac{\pi}{2}$ را به n اضافه کنیم، $\sin$ به $\cos$ تبدیل می‌شود.~~

$$15 \quad \sqrt{1 + \sin^2 n} = \sqrt{1 - \cos^2 n} \xrightarrow{\text{پولار}} 1 + \sin^2 n = 1 - \cos^2 n$$

$$1 + \sin^2 n = 1 - \cos^2 n$$

$$\sin^2 n + \sin^2 n - 1 = 0 \rightarrow \sin^2 n = 1 \rightarrow n = k\pi - \frac{\pi}{2} \rightarrow n = k\pi - \frac{\pi}{2}$$

$$\cos^2 n + \sin^2 n - 1 = 0 \rightarrow \sin^2 n = 1 \rightarrow n = k\pi + \frac{\pi}{2} \rightarrow n = k\pi + \frac{\pi}{2}$$

$$20 \quad \hookrightarrow \text{جواب} = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2} \rightarrow \text{جواب} = \frac{\pi}{2}$$

$$\sin^2 n - \cos^2 n = 1 \rightarrow -\cos^2 n = 1 \rightarrow \cos^2 n = -1 \rightarrow n = k\pi + \pi \rightarrow n = k\pi + \frac{\pi}{2} \quad (الف) \quad (10)$$

$$25 \quad \sin^2 n = \cos^2 n = -1 \quad \text{چون $\sin^2$ و $\cos^2$ همیشه مثبت هستند} \rightarrow \text{دایره واحد}$$

$$n = k\pi$$

$$n = k\pi - \frac{\pi}{2}$$