

۲/۱۳

تکلیف ۱۶

نویسنده: ...

$$\cos^2 m = \sin^2 m - 1 \quad \text{پیش‌فرض}$$

$$\cos^2 m - \sin^2 m = \sin^2 m - 1 \quad \xrightarrow{+1} \quad \cos^2 m + 1 - \sin^2 m = 0$$

$$2 - 2\sin^2 m - \sin^2 m = 0 \quad \xrightarrow{+2\cos^2 m} \quad 2\cos^2 m = \sin^2 m - 2\cos^2 m$$

$$4\cos^2 m - \sin^2 m = 0 \quad \Delta = 1 + 4 \quad \sim \quad \frac{-1 \pm \sqrt{17}}{2} = -2 \quad \checkmark$$

$$\sin m = \frac{1}{2} \quad \text{Unit Circle} \quad \boxed{2k\pi + \frac{\pi}{6}} \quad \boxed{2k\pi + \pi - \frac{\pi}{6}} = \boxed{2k\pi + \frac{5\pi}{6}}$$

$$\text{ب) } \cos^2 m + \cos m - 2 = 0 \Rightarrow \cos^2 m - \sin^2 m + \cos m - 2 = 0$$

$$2\cos^2 m + \cos m - 2 = 0 \quad \Delta = 1 + 16 \quad \sim \quad \frac{-1 \pm \sqrt{17}}{2} = -2 \quad \checkmark$$

شکست حصر آبادی در عملیات ثامن الائمه علیه السلام (۱۳۶۰ هـ ش) - روز گردشگری

$$\text{الف) } \sin^2 m - \cos^2 m = \sin^2 m \Rightarrow \sin^2 m - \cos^2 m = \sin^2 m \quad \text{Unit Circle}$$

$$\sin^2 m + \cos^2 m = 1 \Rightarrow \sin^2 m = 1 \Rightarrow \sin m = \pm 1$$

$$\Rightarrow m = 2k\pi - \frac{\pi}{2} \quad \text{or} \quad m = 2k\pi + \frac{\pi}{2}$$

$$\text{ب) } 2\cos^2 m + 2\sin m (\cos m - 1) = 0 \Rightarrow \sin^2 m = 1 - 2\cos^2 m \Rightarrow \sin^2 m - \cos^2 m = 0$$

$$\sin^2 m = \cos^2 m \Rightarrow \sin m = \pm \cos m \Rightarrow \sin m = \cos(\pi - m) \Rightarrow \sin m = \sin(\pi - m)$$

$$\text{الف) } \cot m (2\cos m + 1) = \frac{1}{\sin m} \Rightarrow \frac{\cos m (2\cos m + 1)}{\sin m} = \frac{1}{\sin m}$$

$$\Rightarrow 2\cos^2 m + \cos m - 1 = 0 \Rightarrow \Delta = 9 \Rightarrow \frac{-1 \pm 3}{2} = 1 \quad \text{Unit Circle}$$

$$\text{ب) } 2\sin^2 m - \sin m \cos m + \cos^2 m = 1 \Rightarrow \sin^2 m - \sin m \cos m = 0$$

$$\sin m (\sin m - \cos m) = 0 \Rightarrow \sin m = 0 \quad \text{or} \quad \sin m = \cos m$$

$\cos(\frac{\pi}{4} + m) \cos(m - \frac{\pi}{4}) = \frac{1}{2} \Rightarrow \frac{1}{2} \sin(\frac{\pi}{4} - m) = \frac{1}{2} \Rightarrow \sin(\frac{\pi}{4} - m)$
 $m = k\pi + \frac{\pi}{4} \Rightarrow 2k\pi + \frac{\pi}{2} = \frac{\pi}{4} - m \Rightarrow \sin \frac{\pi}{4} =$
 $m = -k\pi - \frac{\pi}{4} \Rightarrow k\pi + \frac{\pi}{4} = \frac{\pi}{4} - m \Rightarrow \sin \frac{\pi}{4} =$

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$m = \frac{k\pi}{2} - \frac{\pi}{4}$

$\cos(2m - \frac{\pi}{4}) = \sin 2m \Rightarrow \cos(2m - \frac{\pi}{4}) = \cos(\frac{\pi}{4} + 2m)$
 $x - \frac{\pi}{4} = 2k\pi \Rightarrow 2m - \frac{\pi}{4} = 2k\pi \pm \frac{\pi}{4}$
 $m = k\pi - \frac{\pi}{8}$

$\sin 2m + \sin 2m - \sin 2m = \cos 2m \Rightarrow \frac{\sin 2m}{\sin 2m} + 1 = \sin 2m + \cos 2m$
 $\frac{\sin 2m}{\sin 2m} = 0 \Rightarrow \sin 2m = 0$
 $2m = k\pi \Rightarrow m = \frac{k\pi}{2}$
 $m = \frac{k\pi}{2} + \frac{\pi}{4}$

$\frac{\sin m/2}{1 + \cos m/2} = \frac{1}{\sin m/2} + \frac{\cos m/2}{\sin m/2} \Rightarrow \frac{\cos m/2}{\sin m/2} = 0 \Rightarrow m \neq 2k\pi$
 $m = -\pi/2$
 $k = 190$

$\frac{1 - \tan}{1 + \tan} = \tan(\frac{\pi}{4} - m) \Rightarrow m = k\pi + \frac{\pi}{4}$
 $\cos m, \sin m \neq 0 \Rightarrow m \neq 2k\pi \pm \frac{\pi}{4}$
 $1 + \tan m \neq 0 \Rightarrow m \neq k\pi + \frac{\pi}{2}$

$\cos^2 m - \sin^2 m \cos^2 m = 1 \Rightarrow \sin^2 m = 0$
 $m = \frac{2k\pi}{2} \pm \frac{\pi}{2} \Rightarrow m = k\pi \pm \frac{\pi}{2}$
 $k = 0 \Rightarrow \frac{\pi}{2}, \frac{3\pi}{2}$
 $k = 1 \Rightarrow \frac{5\pi}{2}, \frac{7\pi}{2}$
 $k = 2 \Rightarrow \frac{9\pi}{2}, \frac{11\pi}{2}$

$1 + \sin 2m = 2 \cos^2 m \Rightarrow 1 + \sin 2m = 2 \cos^2 m$
 $\tan m = -1 \Rightarrow \sin m + \cos m = \sqrt{2}(\cos - \sin)(\cos + \sin)$
 $\sin(m - \frac{\pi}{4}) = \frac{1}{\sqrt{2}} \Rightarrow \cos - \sin m = -\frac{\sqrt{2}}{2}$

$(\sin^2 m - \cos^2 m)(\sin^2 m + \cos^2 m) = 1 \Rightarrow \sin^2 m = 1 + \cos^2 m$
 $\Rightarrow \sin m = 1 \text{ or } -1$

$(\sin^2 m - \cos^2 m)(\sin^2 m + \cos^2 m + \sin^2 m \cos^2 m) = -1$
 $\cos m = 0 \Rightarrow m = k\pi + \frac{\pi}{2}$

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

$\sin(1 + \sin) - \cos(1 + \cos) = 1 \Rightarrow m = 49, 3\pi/2, 2\pi$