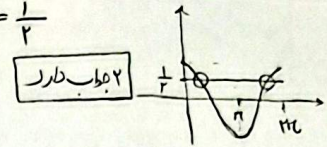
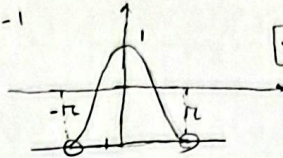


1 $\sec \pi - \tan \pi = 1 \Rightarrow \sec \pi = 1 + \tan \pi = \frac{1}{\cos \pi} \Rightarrow \sec \pi = 1 \Rightarrow \cos \pi = \frac{1}{1} \Rightarrow \cos \pi = \frac{1}{1}$
 $\tan \pi = 0 \Rightarrow \cos \pi \neq 0$



۲ $\omega \sin^2 \pi + 2 \cos^2 \pi = -2 \Rightarrow \omega(1 - \cos^2 \pi) + 2(\cos^2 \pi - 1) = -2 \Rightarrow \omega \cos^2 \pi - \omega \cos^2 \pi - 4 \cos^2 \pi + 2 = 0$
 $\Rightarrow (\cos \pi + 1)(\cos^2 \pi - 13 \cos \pi + 11) = 0 \Rightarrow \cos \pi = -1$
 $(13)^2 - 4(1)(11) = 0 \Rightarrow \sin^2 \pi = 0$



۳ $\sqrt{2} \sin \pi \cos \pi + \sin \pi = 1 \Rightarrow \sin \pi (\sqrt{2} \cos \pi + 1) = 1 \Rightarrow \sin \pi (\sqrt{2}(1 - \sin \pi) + 1) = 1 \Rightarrow \sqrt{2} \sin^2 \pi - \sqrt{2} \sin \pi + 1 = 0$
 $\Rightarrow (\sin \pi + 1)(\sqrt{2} \sin \pi - \sqrt{2} \sin \pi + 1) = 0$
 $\begin{cases} \sin \pi = -1 \Rightarrow \pi = 2k\pi + \frac{3\pi}{2} \\ \sin \pi = \frac{1}{\sqrt{2}} \Rightarrow \pi = 2k\pi + \frac{\pi}{4} \end{cases}$
 $\pi = 2k\pi + \frac{\pi}{4} \Rightarrow \pi = 2k\pi + \frac{\pi}{4}$

۴ $\frac{1}{\sin(\frac{\pi}{4} + \pi)} + \frac{1}{\cos(\frac{\pi}{4} + \pi)} = \frac{1}{\cos \pi} + \frac{1}{-\sin \pi} = -\frac{\sin \pi + \cos \pi}{\cos \pi \sin \pi} = -\frac{\cos \pi (\sin \pi + 1)}{\cos \pi \sin \pi} = -\frac{\sin \pi + 1}{\sin \pi} = 0$
 $\Rightarrow \sin \pi + 1 = 0 \Rightarrow \sin \pi = -1 \Rightarrow \pi = 2k\pi + \frac{3\pi}{2} \Rightarrow \pi = \frac{11\pi}{2} \Rightarrow \frac{11\pi}{2} - \frac{\sqrt{\pi}}{2} = \frac{6\pi}{2} = \frac{\pi}{2} = \alpha$
 $\Rightarrow \tan \alpha = \tan \frac{\pi}{2} = -\sqrt{3}$

۵ $\cos(\pi + \frac{\pi}{4}) = \frac{1}{\sqrt{2}} \Rightarrow \cos \pi \cdot \cos \frac{\pi}{4} - \sin \pi \cdot \sin \frac{\pi}{4} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2} (\cos \pi - \sin \pi) \Rightarrow \cos \pi - \sin \pi = \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{\sqrt{2}} *$
 $m(\cos \pi - \sin \pi) - \sqrt{2} \sin(\pi) = \sqrt{2} \Rightarrow \sqrt{2} \sin \pi = \sqrt{2} (\frac{m}{\sqrt{2}} - 1) \Rightarrow \sin \pi = \frac{m-1}{\sqrt{2}}$
 $\sin \pi = \frac{(\cos \pi - \sin \pi)^2}{2} = \cos^2 \pi + \sin^2 \pi - 2 \cos \pi \sin \pi = 1 - \sin \pi = \frac{\sqrt{2}}{2} \Rightarrow \sin \pi = \frac{1}{\sqrt{2}}$

۶ $\sin(\pi + \frac{\pi}{4}) \cos(\pi - \frac{\pi}{4}) = 1 \Rightarrow \sin(\pi - \frac{\pi}{4}) \cos(\pi - \frac{\pi}{4}) = \cos^2(\pi - \frac{\pi}{4}) = 1 \Rightarrow \cos(\pi - \frac{\pi}{4}) = \pm 1$
 $\Rightarrow \pi - \frac{\pi}{4} = k\pi \Rightarrow \pi = k\pi + \frac{\pi}{4} \Rightarrow \pi = \frac{\pi}{4}$

۷ $\sin \pi + \sqrt{3} \cos \pi = \sqrt{2} \Rightarrow \frac{1}{2} \sin \pi + \frac{\sqrt{3}}{2} \cos \pi = \cos \frac{\pi}{6} \sin \pi + \sin \frac{\pi}{6} \cos \pi = \sin(\pi + \frac{\pi}{6}) = \frac{\sqrt{2}}{2}$
 $\Rightarrow \begin{cases} \pi + \frac{\pi}{6} = 2k\pi + \frac{\pi}{6} \Rightarrow \pi = 2k\pi - \frac{\pi}{6} \\ \pi + \frac{\pi}{6} = 2k\pi + \frac{5\pi}{6} \Rightarrow \pi = 2k\pi + \frac{4\pi}{6} \end{cases}$

۸ $\sqrt{2} \sin \pi \sin(\frac{\pi}{4} - \pi) = 1 \Rightarrow \sqrt{2} \sin \pi \cos \pi = -1 \Rightarrow \sqrt{2} \sin \pi = -1 \Rightarrow \sin \pi = -\frac{1}{\sqrt{2}}$
 $\pi = 2k\pi - \frac{\pi}{4} \Rightarrow \pi = k\pi - \frac{\pi}{4}$
 $\pi = 2k\pi - \frac{\pi}{4} \Rightarrow \pi = k\pi - \frac{\pi}{4}$

۹ $(1 + \cos(\alpha))(1 + \cos(\beta))(1 + \cos(\gamma)) = \frac{1}{\sqrt{2}} = (\sqrt{2} \cos^2 \alpha)(\sqrt{2} \cos^2 \beta)(\sqrt{2} \cos^2 \gamma) \Rightarrow \sqrt{2} \sin^2 \alpha \cos^2 \alpha (\sqrt{2} \cos^2 \beta) (\sqrt{2} \cos^2 \gamma) = \frac{1}{\sqrt{2}}$
 $\Rightarrow \frac{1}{\sqrt{2}} \sin^2 \alpha \cos^2 \alpha (\sqrt{2} \cos^2 \beta) (\sqrt{2} \cos^2 \gamma) = \frac{1}{\sqrt{2}} \sin^2 \alpha \cos^2 \alpha = \frac{1}{\sqrt{2}} \sin^2 \alpha = \frac{1}{\sqrt{2}} \sin^2 \alpha \Rightarrow \sin^2 \alpha = \sin^2 \alpha \Rightarrow \sin \alpha = \pm \sin \alpha$
 $\Rightarrow \begin{cases} \sin \alpha = \sin \alpha \Rightarrow \alpha = 2k\pi + \alpha \Rightarrow \alpha = \frac{\pi}{4} \\ \alpha = 2k\pi + \pi - \alpha \Rightarrow \alpha = \frac{\pi}{2} + \frac{\pi}{4} \\ \sin \alpha = -\sin \alpha = \sin(-\alpha) \Rightarrow \alpha = 2k\pi - \alpha \Rightarrow \alpha = \frac{\pi}{4} \\ \alpha = 2k\pi + \pi + \alpha \Rightarrow \alpha = \frac{\pi}{2} + \frac{\pi}{4} \end{cases}$

$$10 \quad \tan(\pi n) \tan(n) = 1 \Rightarrow \tan(\pi n) = \frac{1}{\tan(n)} \Rightarrow \tan \pi n = \cot n = \tan\left(\frac{\pi}{2} - n\right) \Rightarrow \pi n = K\pi + \frac{\pi}{2} - n \Rightarrow \pi n = K\pi + \frac{\pi}{2}$$

$$\Rightarrow n = \frac{K\pi}{\pi} + \frac{\pi}{\pi}$$

K	۴	۵	۶	۷
n	$\frac{9\pi}{\pi}$	$\frac{11\pi}{\pi}$	$\frac{13\pi}{\pi}$	$\frac{15\pi}{\pi}$

$$\frac{9\pi}{\pi} + \frac{11\pi}{\pi} + \frac{13\pi}{\pi} + \frac{15\pi}{\pi} = \boxed{4\pi}$$

$\tan \pi n, \tan n$ با تعریف شده در همانند به سبب آن بزرگتر است