

$$\frac{1}{\sqrt{\cos \alpha}} - \frac{1}{\cot \alpha} = \frac{1 - \sin \alpha}{|\cos \alpha|} \Rightarrow \frac{1}{|\cos \alpha|} - \tan \alpha = \frac{1}{|\cos \alpha|} - \frac{\sin \alpha}{|\cos \alpha|} \Rightarrow \frac{\sin \alpha}{\cos \alpha} = \frac{\sin \alpha}{|\cos \alpha|} \Rightarrow \cos \alpha > 0$$

$$\cot \alpha = \frac{\cos \alpha}{\sqrt{1 - \cos^2 \alpha}} = \frac{\cos \alpha}{|\sin \alpha|} = \frac{\cos \alpha}{\sin \alpha} \Rightarrow \frac{\cos \alpha}{\sin \alpha} = \frac{\cos \alpha}{|\sin \alpha|} \Rightarrow \sin \alpha > 0$$

$\alpha$  در ناحیه اول قرار دارد

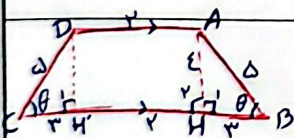
$$-\frac{\pi}{12} < x < \frac{5\pi}{12} \Rightarrow -\frac{\pi}{6} < 2x < \frac{5\pi}{6} \Rightarrow -\frac{1}{2} < \sin 2x < 1 \xrightarrow{\sin 2x = \frac{m-1}{2}} \frac{1}{2} < \frac{m-1}{2} < 1$$

$$-2 < m-1 < 2 \Rightarrow -1 < m < 3$$

$$\tan x + \cot x = \frac{1}{\sin x \cos x} = -\frac{1}{3} \Rightarrow \sin x \cos x = -\frac{1}{3} \quad \sin^2 x + \cos^2 x = 1$$

$$\Rightarrow \sin^2 x + \cos^2 x + 2 \sin x \cos x = \frac{1}{9} \Rightarrow (\sin x + \cos x)^2 = \frac{1}{9} \Rightarrow \sin x + \cos x = \sqrt{\frac{1}{9}} \Rightarrow \sin^2 x + \cos^2 x =$$

$$(\sin x - \cos x)^2 - 2 \sin x \cos x (\sin x + \cos x) = \frac{1}{9} \sqrt{\frac{1}{9}} - 2 \left(-\frac{1}{3}\right) \left(\sqrt{\frac{1}{9}}\right) = \frac{1}{9} \sqrt{\frac{1}{9}} \Rightarrow \frac{1}{\sin^2 x + \cos^2 x} = \frac{1}{-\frac{1}{9} \sqrt{\frac{1}{9}}}$$



$$\triangle ABH: \cos \theta = \frac{BH}{AB} = \frac{BH}{5} = \frac{4}{5} \Rightarrow BH = 4 \quad AH^2 + BH^2 = AB^2 \Rightarrow AH^2 = 9 \Rightarrow AH = 3$$

$$\left. \begin{array}{l} AB = DC \\ \hat{A}_1 = \hat{H}'_1 = 90^\circ \\ \hat{C} = \hat{B} = \theta \end{array} \right\} \Rightarrow \triangle ABH \cong \triangle DCH' \Rightarrow CH' = BH = 4$$

$$\left. \begin{array}{l} AD \parallel HH' \\ AH \parallel DH' \\ \hat{H}_r = 90^\circ \end{array} \right\} \Rightarrow ADH'H' \Rightarrow AD = HH' = 2$$

$$S = \frac{AD + BC}{2} \times AH = \frac{2 + 10}{2} \times 3 = 18$$

$$\tan(215^\circ) \tan(-145^\circ) - \sin(105^\circ) \cos(255^\circ) = -\cot(15^\circ) \tan(15^\circ) - \sin(15^\circ) (-\sin 15^\circ)$$

$$\tan(215^\circ) = \tan(180^\circ + 35^\circ) = \tan(35^\circ) = \cot 15^\circ \quad = -1 + \sin^2(15^\circ) = -\cos^2 15^\circ$$

$$\tan(-145^\circ) = \tan(180^\circ - 35^\circ) = -\tan(35^\circ) = -\cot 15^\circ$$

$$-\cos^2 15^\circ = K \cos^2 15^\circ$$

$$\sin(105^\circ) = \sin(90^\circ + 15^\circ) = \cos 15^\circ$$

$$\Rightarrow K = -1$$

$$\cos(255^\circ) = \cos(180^\circ - 75^\circ) = -\cos 75^\circ = -\sin 15^\circ$$

$$A = \sqrt{r} \cos(\gamma \cdot \omega) \sin(\gamma \omega) - \sqrt{r} \sin(\gamma \omega) \cos(\gamma \omega)$$

$$= \sqrt{r} \left( \frac{\sqrt{r}}{r} \right) (-\cos \gamma \omega) - \sqrt{r} \left( \frac{\sqrt{r}}{r} \right) (-\cos \gamma \omega) = \frac{r}{r} \cos(\gamma \omega) + \cos(\gamma \omega) = \frac{2}{r} \cos(\gamma \omega)$$

$$\frac{\frac{2}{r} \cos(\gamma \omega)}{\cos(\gamma \omega)} = \frac{2}{r}$$

$$f(x) = 14 \cos^2(x) \cos^2(2x) \cos^2(3x) \cos^2(4x) \quad x = \frac{\pi}{4}$$

$$f\left(\frac{\pi}{4}\right) = 14 \cos^2\left(\frac{\pi}{4}\right) \cos^2\left(\frac{\pi}{2}\right) \cos^2\left(\frac{3\pi}{4}\right) \cos^2\left(\pi\right) = 14 \cos^2(1\omega) \cos^2(2\omega) \cos^2(3\omega) \cos^2(4\omega)$$

$$14 \times \frac{r}{r} \times \frac{r}{r} \times \frac{r}{r} \times \cos^2(1\omega) = \frac{r}{r} \cos^2(1\omega) = \frac{r}{r} \times \frac{r+\sqrt{r}}{r} = \frac{r+\sqrt{r}}{r}$$

$$\cos^2(1\omega) = 1 - \sin^2(1\omega) = 1 - \frac{r-\sqrt{r}}{r} = \frac{r+\sqrt{r}}{r}$$

$$\sin^2(1\omega) = \frac{1-\cos 2\omega}{2} = \frac{1-\frac{r}{r}}{2} = \frac{r-\sqrt{r}}{r}$$

$$1 - \sin x = \frac{r}{r} + \frac{r}{r} \sin x \Rightarrow \sin x = -\frac{r}{r} \Rightarrow \sin x = -\frac{r}{r} \Rightarrow \sin^2 x = \frac{r}{r} \Rightarrow 1 - \sin^2 x = \frac{r}{r}$$

$$\tan \frac{x}{r} = \frac{\sin x}{1 + \cos x} = \frac{-\frac{r}{r}}{1 - \frac{r}{r}} = \frac{-\frac{r}{r}}{\frac{r}{r}} = -\frac{r}{r}$$

$$\Rightarrow \cos^2 x = \frac{r}{r} \Rightarrow \cos x = \pm \frac{r}{r}$$

$$\text{for } x \Rightarrow \cos x = -\frac{r}{r}$$

$$\frac{\sin \theta}{1 - \cos \theta} = \frac{r \cos \frac{\theta}{r} \sin \frac{\theta}{r}}{r \sin^2 \frac{\theta}{r}} = \frac{\cos \frac{\theta}{r}}{\sin \frac{\theta}{r}} = \cot \frac{\theta}{r}$$

$$\frac{\sin \theta}{1 - \cos \theta} = \frac{\sin \theta (1 + \cos \theta)}{1 - \cos^2 \theta} = \frac{\sin \theta (1 + \cos \theta)}{\sin^2 \theta} = \frac{1 + \cos \theta}{\sin \theta} = \cot \frac{\theta}{r}$$

$$\frac{\sin \theta}{1 - \cos \theta} + \frac{1 + \cos \theta}{\sin \theta} = r \cot \frac{\theta}{r} = K \cot \frac{\theta}{r} \Rightarrow K = r$$

$$\sin \alpha = \frac{\sqrt{r}}{r} \Rightarrow \sin^2 \alpha = \frac{r}{r^2} \Rightarrow \cos^2 \alpha = \frac{r-r}{r^2} \Rightarrow \cos \alpha = \pm \frac{\sqrt{r-r}}{r} = \pm \frac{\sqrt{r}}{r} \Rightarrow \cos \alpha = -\frac{\sqrt{r}}{r}$$

$$\cos\left(\frac{11\pi}{r} + \alpha\right) = \underbrace{\cos\left(\frac{11\pi}{r}\right)}_{\cos \frac{11\pi}{r}} \cos(\alpha) - \underbrace{\sin\left(\frac{11\pi}{r}\right)}_{\sin \frac{11\pi}{r}} \sin(\alpha) = \left(-\frac{\sqrt{r}}{r}\right) \left(-\frac{\sqrt{r}}{r}\right) - \left(\frac{\sqrt{r}}{r}\right) \left(\frac{\sqrt{r}}{r}\right)$$

$$= \frac{r}{r^2} - \frac{r}{r^2} = \frac{r}{r^2} = \frac{r}{r}$$