۱

$$\frac{1-\sin\alpha}{|\cos\alpha|} \to \frac{1}{|\cos\alpha|} - \frac{\sin\alpha}{\cos\alpha} = \frac{1-\sin\alpha}{|\cos\alpha|} \to \frac{\sin\alpha}{\cos\alpha} = \frac{1-1+\sin\alpha}{|\cos\alpha|}$$

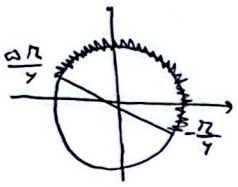
$$\cot\alpha = \frac{\cos\alpha}{\sqrt{1-\cos^2\alpha}} = \frac{\cos\alpha}{|\sin\alpha|} \to \frac{\cos\alpha}{|\sin\alpha|} = \frac{\cos\alpha}{\sin\alpha} \to \sin\alpha \geq 0$$

[۲]

$\cos\alpha \geq 0$ [۱]

ناحیه اول

۲



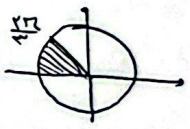
$$-\frac{\pi}{4} < x < \frac{5\pi}{4} \leftarrow \frac{\pi}{4} < x < \frac{5\pi}{4}$$

$$-\frac{1}{2} < \frac{m-1}{4} \leq 1 \to -2 < m-1 \leq 4 \to \boxed{-1 < m \leq 5}$$

۳

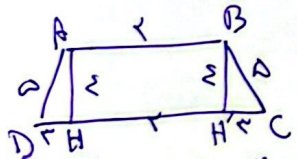
$$\frac{1}{\cos^2 x + \sin^2 x} = \frac{1}{(\sin+\cos)(\sin^2 - \sin\cos+\cos^2)} = \frac{1}{\frac{3}{4}(\sin+\cos)} \quad (\sin x+\cos x)^2 = 1 + 2\sin x\cos x$$

$$\frac{\sin x}{\cos x} + \frac{\cos x}{\sin x} = -2 \to \frac{\sin^2 x + \cos^2 x}{\sin x\cos x} = -2 \to \sin x\cos x = -\frac{1}{2}$$



$$\frac{1}{\frac{3}{4}(\sin+\cos)} = \frac{1}{\frac{3}{4} \times -\frac{1}{\sqrt{2}}} = \frac{-4\sqrt{2}}{3} = \boxed{-0.18\sqrt{2}}$$

۴



$$\cos\alpha = \frac{6}{10} \to \frac{6}{AD} = \frac{DH}{AD} \to DH = 2 \to A\hat{D}H = B\hat{H}C$$

$$BH' = 2 \quad AB = HH' = 2$$

$$A\hat{D}H \to AH^2 + DH^2 = AD^2 \quad (8,6,10)$$

$$AH = 8 \to H'C = 4 \quad DC = 2+2+4 = 8 \quad S = \frac{4 \times (10)}{2} = 20$$

۵

$$\tan(225^\circ)\frac{\tan(-140^\circ)}{-\tan(140^\circ)} - \sin\underbrace{(1950^\circ)}_{5\times360+150}\cos(240) = \tan(270+30)(-\tan(180-150)) - (\sin 30)\cos(270-30)$$

$$(-\cot 30)(\tan 30) - (\sin 30)(-\sin(-30)) = -1 + \sin^2 30 = -\cos^2(30) \to \boxed{k=1}$$

٦

$A = \sqrt{2}\cos(110^\circ)\sin(245^\circ) + \sqrt{2}\cos(245^\circ)\cos(145^\circ)$

$\cos(245^\circ) = -\cos(65^\circ)$, $\sin(245^\circ) = -\cos(25^\circ)$, $\cos(110^\circ) = -\frac{\sqrt{2}}{2}$

٥

$\sqrt{2}\cos(25^\circ) + \cos(25^\circ) = 1.5\cos(25^\circ)$

$\cos(25^\circ) = \sin(65^\circ)$

$1.5\sin(65^\circ)$

٧

$f(\frac{\pi}{24}) = 16\cos^2\frac{\pi}{24}\cos^2\frac{\pi}{8}\cos^2\frac{\pi}{4}\cos^2\frac{3\pi}{8} = 16(\frac{1+\cos\frac{\pi}{4}}{2})(\frac{\sqrt{2}}{2})^2(\frac{1}{2})^2(-\frac{1}{2})^2$

$= 1(1+\frac{\sqrt{2}}{2}) = 1 \times \frac{1}{4} \times \frac{2}{2} = \frac{2+\sqrt{2}}{16}$

٨

$\frac{1-\sin x}{1+\sin x} = 3 \rightarrow 3+3\sin x = 1-\sin x$

$4\sin x = -2 \rightarrow \sin x = -\frac{2}{4}$ $\rightarrow$ $\sin x = \frac{2\tan\frac{x}{2}}{1+\tan^2\frac{x}{2}} = -\frac{2}{5} \rightarrow$

$2\tan^2\frac{x}{2} + 1 - \tan\frac{x}{2} + 2 = 0 \rightarrow (2\tan\frac{x}{2}+1)(\tan\frac{x}{2}+2) = 0$ $\rightarrow$ $\tan\frac{x}{2} = -\frac{1}{2}$, $\tan\frac{x}{2} = -2$

٩

$\frac{\sin\alpha}{1-\cos\alpha} = \cot\frac{\alpha}{2}$ $\quad$ $\frac{\sin\alpha}{1-\cos\alpha} + \frac{1+\cos\alpha}{\sin\alpha} = 2\cot\frac{\alpha}{2} \rightarrow k=2$

$\frac{1+\cos\alpha}{\sin\alpha} = \cot\frac{\alpha}{2}$

١٠

$\cos(\alpha+\beta) = \cos\alpha\cos\beta - \sin\alpha\sin\beta \rightarrow +\frac{\sqrt{192}}{20} - \frac{\sqrt{4}}{20} \rightarrow +\frac{14}{20} - \frac{2}{20} = \frac{12}{20}$, $\pm\frac{3}{5}$

$\beta = \frac{11\pi}{4} = 2\pi + \frac{3\pi}{4}$ $\rightarrow$ $\sin\frac{3\pi}{4} = \frac{\sqrt{2}}{2}$, $\cos\frac{3\pi}{4} = -\frac{\sqrt{2}}{2}$

$\alpha \rightarrow$ $\sin\alpha = \frac{\sqrt{2}}{10}$, $\cos\alpha = -\frac{\sqrt{98}}{10}$

$\sin^2\alpha + \cos^2\alpha = 1$

$\frac{2}{100} + \frac{98}{100}$