نام و نام خانوادگی ....علی صنعتی........ پاسخنامه تشریحی تکلیف شماره ۲۸...... کلاس ..یازدهم سیر A..........

۲۰ آفرین!

۱ ۲

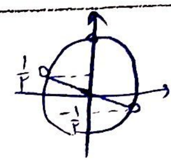
$$\cot\alpha = \frac{\cos\alpha}{\sqrt{1-\cos^2\alpha}} = \frac{\cos\alpha}{\sqrt{\sin^2\alpha}} = \frac{\cos\alpha}{|\sin\alpha|} \rightarrow \sin\alpha > 0 \quad (1)$$

$$\frac{1}{\sqrt{\cos^2\alpha}} - \frac{1}{\cot\alpha} = \frac{1-\sin\alpha}{|\cos\alpha|} \rightarrow \frac{1}{|\cos\alpha|} - \frac{\sin\alpha}{\cos\alpha} = \frac{1-\sin\alpha}{|\cos\alpha|} \rightarrow \frac{1-1+\sin\alpha}{|\cos\alpha|} = \frac{\sin\alpha}{\cos\alpha}$$

$\rightarrow \cos\alpha > 0 \quad (2) \xrightarrow{(1),(2)}$ α در ناحیه اول مثلثاتی ✓

۲ ۲

$$\frac{-\pi}{12} < x < \frac{5\pi}{12} \rightarrow \frac{-\pi}{6} < 2x < \frac{5\pi}{6} \xrightarrow{\sin 2x = \frac{m-1}{4}} -\frac{1}{2} < \frac{m-1}{4} \leq 1$$



$$\rightarrow -2 < m-1 \leq 4 \rightarrow -1 < m \leq 5$$ ✓

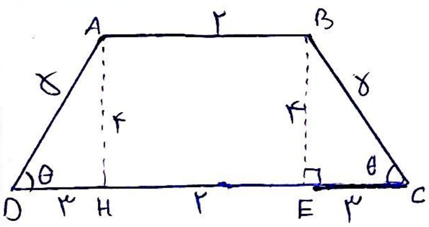
۳ ۲

$$\tan x + \cot x = \frac{1}{\sin x\cos x} = -3 \rightarrow \sin x\cos x = -\frac{1}{3} \rightarrow (\sin x + \cos x)^2 = 1 + 2\sin x\cos x$$

$$= \frac{1}{3} \rightarrow |\sin + \cos| = \frac{\sqrt{3}}{3} \xrightarrow{\frac{3\pi}{4} < x < \pi} \sin x + \cos x = \frac{-\sqrt{3}}{3}$$

$$\rightarrow \frac{1}{\sin^3 x + \cos^3 x} = \frac{1}{(\sin+\cos)(\sin^2+\cos^2-\sin\cos)} = \frac{1}{\frac{-\sqrt{3}}{3}\left(1+\frac{1}{3}\right)} = \frac{-9}{4\sqrt{3}}$$ ✓

۴ ۲



$$\cos\theta = \frac{EC}{BC} = \frac{EC}{5} = \frac{6}{10} \rightarrow EC = 3 \xrightarrow{\text{فیثاغورث}} \boxed{BE = 4}$$

$$\rightarrow \frac{HD}{DA} = \frac{HD}{5} = \frac{6}{10} \rightarrow HD = 3$$

$$\rightarrow \boxed{DC = 8} \rightarrow S = \frac{(AB+DC)(BE)}{2} = \frac{(2+8)(4)}{2}$$

$$= 20$$ ✓

۵ ۲

$$\tan(285^\circ)\tan(-165^\circ) - \sin(1095^\circ)\cos(255^\circ) = \tan\left(\frac{3\pi}{2}+15^\circ\right)\tan(-\pi+15^\circ)$$

$$- \sin(6\pi+15^\circ)\cos\left(\frac{3\pi}{2}-15^\circ\right) = (-\cot 15^\circ)(\tan 15^\circ) - (\sin 15^\circ)(-\sin 15^\circ)$$

$$= -1 - (-\sin^2 15) = -1 + \sin^2 15 = -\cos^2 15 \rightarrow k = -1$$ ✓

$$A = \sqrt{3}\cos(210^\circ)\sin(243^\circ) - \sqrt{2}\sin(135^\circ)\cos(153^\circ)$$ ۶

$$= -\frac{3}{2}\sin\left(\frac{3\pi}{2} - 27^\circ\right) - (1)\cos(\pi - 27^\circ) = -\frac{3}{2}(-\cos 27^\circ) - (-\cos 27^\circ)$$

$$= 2.5\cos 27^\circ \longrightarrow \frac{A}{\cos 27^\circ} = 2.5$$

$$\cos 15^\circ = \cos(45^\circ - 30^\circ) = \cos 45\cos 30 + \sin 45^\circ \sin 30^\circ = \frac{\sqrt{6}}{4} + \frac{\sqrt{2}}{4} = \frac{\sqrt{6}+\sqrt{2}}{4}$$ ۷

$$\longrightarrow 16\cos^2(15^\circ)\cos^2(30^\circ)\cos^2(60^\circ)\cos^2(120^\circ) = 16\left(\frac{\sqrt{6}+\sqrt{2}}{4}\right)^2\left(\frac{\sqrt{3}}{2}\right)^2\left(\frac{1}{2}\right)^2\left(-\frac{1}{2}\right)^2$$

$$= \cancel{16}\,\frac{8+2\sqrt{12}}{\cancel{16}} \times \frac{3}{4} \times \frac{1}{4} \times \frac{1}{4} = \frac{24+6\sqrt{12}}{64} = \frac{6+3\sqrt{3}}{16}$$

$$\frac{1-\sin x}{1+\sin x} = 4 \rightarrow 1 - \sin x = 4 + 4\sin x \longrightarrow 5\sin x = -3 \rightarrow \sin x = -\frac{3}{5}$$ ۸

$$\xrightarrow{\text{ربع چهارم}} \cos x = -\frac{4}{5} \longrightarrow \tan\left(\frac{x}{2}\right) = \frac{1-\cos x}{\sin x} = \frac{\sin x}{1+\cos x} = \frac{-\frac{3}{5}}{\frac{1}{5}} = -3$$

$$\frac{\sin\alpha}{1+\cos\alpha} = \frac{2\sin\frac{\alpha}{2}\cos\frac{\alpha}{2}}{2\cos^2\frac{\alpha}{2}} = \tan\frac{\alpha}{2} \quad \Bigg\} \quad \frac{1-\cos\alpha}{\sin\alpha} = \frac{2\sin^2\frac{\alpha}{2}}{2\sin\frac{\alpha}{2}\cos\frac{\alpha}{2}} = \tan\frac{\alpha}{2}$$ ۹

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

$$\longrightarrow k = 2$$

$$\sin\alpha = \frac{\sqrt{2}}{10} \rightarrow \sin^2 + \cos^2 = 1 \rightarrow \cos^2\alpha = \frac{98}{100} \xrightarrow{\text{ربع دوم}} \cos\alpha = -\frac{\sqrt{98}}{10}$$

$$\longrightarrow \cos\left(\frac{11\pi}{4} + \alpha\right) = \left(\cos\frac{11\pi}{4}\right)(\cos\alpha) - \left(\sin\frac{11\pi}{4}\right)(\sin\alpha) = \left(\frac{-\sqrt{2}}{2}\right)\left(-\frac{\sqrt{98}}{10}\right)$$ ۱۰

$$-\left(\frac{\sqrt{2}}{2}\right)\left(\frac{\sqrt{2}}{10}\right) = \frac{14}{20} - \frac{2}{20} = \frac{12}{20}$$