19,5

نام و نام خانوادگی ..... پاسخنامه تشریحی تکلیف شماره ۲۸ کلاس یازدهم سری A .....

۱ (۲)

$\cot\alpha = \frac{\cos\alpha}{\sqrt{1-\cos^2\alpha}} = \frac{\cos\alpha}{|\sin\alpha|}$ ⇒ هم‌علامت $\cot$ و $\cos$

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

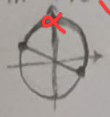
$\cos\alpha > 0$: $\frac{1}{\cos\alpha} - \frac{\sin\alpha}{\cos\alpha} = \frac{1-\sin\alpha}{\cot\alpha}$ ⇒ $1-\sin\alpha = 1-\sin\alpha$ ⇒ $0=0$

$\cos\alpha < 0$: $-\frac{1}{\cos\alpha} - \frac{\sin\alpha}{\cos\alpha} = -\frac{1-\sin\alpha}{\cos\alpha}$ ⇒ $1+\sin\alpha = 1-\sin\alpha$ ⇒ $\sin\alpha = 0$ ✗ ← نمی‌شود چون تعریف $\cot$ نمی‌شود

⇒ $\cos\alpha > 0$, $\cot\alpha > 0$ ⇒ ربع اول α

۲ (۱,۷۵)

$-\frac{\pi}{12} < x < \frac{5\pi}{12}$ ⇒ $-\frac{\pi}{4} < 2x < \frac{5\pi}{4}$ ⇒ $-\frac{1}{2} < \sin 2x \leq 1$ ⇒ $-\frac{1}{2} < \frac{m-1}{4} \leq 1$



$-2 < m-1 \leq 4$ ⇒ $-1 < m \leq 5$ دقت!

۳ (۲)

$\tan x + \cot x = \frac{1}{\sin x \cdot \cos x} = -6$ ⇒ $\sin x \times \cos x = -\frac{1}{6}$

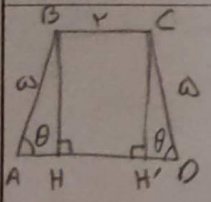
$|\sin x + \cos x| = \sqrt{1 + 2\sin x \cdot \cos x} = \sqrt{1 - \frac{2}{3}} = \frac{\sqrt{3}}{3}$ ⇒ $\frac{3}{4}\pi < x < \pi$ ⇒ $|\sin x| < |\cos x|$

⇒ $\sin x + \cos x = -\frac{\sqrt{3}}{3}$

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

$= \frac{1}{-\frac{\sqrt{3}}{3}\left(1 + \frac{1}{6}\right)} = \frac{1}{-\frac{\sqrt{3}}{3} \times \frac{7}{6}} = -\frac{9}{7\sqrt{3}} = -\frac{3\sqrt{3}}{7}$

۴ (۲)



$AH = AB \cdot \cos\theta$ ⇒ $5 \times 0.6 = 3 = AH = DH'$

$HH' = BC = 2$ ⇒ $AD = 8$ $BH = \sqrt{AB^2 - AH^2} = \sqrt{25-9} = 4$

$DH' = AH = 3$

$S = \frac{BH \times (AD + BC)}{2}$

$S = \frac{4 \times (8+2)}{2} = 20$

۵ (۲)

$\tan(28^\circ) = \tan(\frac{5\pi}{2} + 1^\circ) = -\cot 1^\circ$

$\tan(-14^\circ) = \tan(-\pi + 1^\circ) = +\tan 1^\circ$

$\sin(109^\circ) = \sin(4\pi + 1^\circ) = +\sin 1^\circ$

$\cos(53^\circ) = \cos(\frac{5\pi}{6} - 1^\circ) = -\sin 1^\circ$

$(-\cot 1^\circ)(\tan 1^\circ) - (\sin 1^\circ)(-\sin 1^\circ) = -1 + \sin^2 1^\circ = -\cos^2 1^\circ$

$(-1)(\cos^2 1^\circ) = K\cos^2 1^\circ$ ⇒ $K = -1$

$\cos 210^\circ = \cos(\pi + 30^\circ) = -\cos 30^\circ = -\frac{\sqrt{3}}{2}$

$\sin 460^\circ = \sin(\frac{5\pi}{2} - 270^\circ) = -\cos 270^\circ$

$\sin 140^\circ = \sin(\pi - 40^\circ) = +\sin 40^\circ = \frac{\sqrt{2}}{2}$

$\cos 125^\circ = \cos(\pi - 55^\circ) = -\cos 55^\circ$

$\sqrt{3}\left(-\frac{\sqrt{3}}{2}\right)(-\cos 55^\circ) - \sqrt{2}\left(\frac{\sqrt{2}}{2}\right)(-\cos 55^\circ) = \frac{3}{2}\cos 55^\circ + \cos 55^\circ$

$= \boxed{\frac{5}{2}\cos 55^\circ} \longrightarrow \boxed{\cos 55^\circ \text{ برابر } \frac{5}{2}}$ ✓

(۲) ۶

$\cos^2 75^\circ (\frac{\pi}{24}) = \cos^2 \frac{\pi}{12} = \cos^2 15^\circ$ $\quad \cos^2 15^\circ = \frac{1+\cos 30^\circ}{2} = \frac{1+\frac{\sqrt{3}}{2}}{2} = \frac{2+\sqrt{3}}{4}$

$\cos^2 9(\frac{\pi}{24}) = \cos^2 \frac{\pi}{4} = (\frac{\sqrt{2}}{2})^2 = \frac{2}{4}$

$\cos^2 12(\frac{\pi}{24}) = \cos^2 \frac{\pi}{2} = (\frac{1}{2})^2 = \frac{1}{4}$

$\cos^2 24(\frac{\pi}{24}) = \cos^2 \pi = (-1)^2 = \frac{1}{4}$

$f(\frac{\pi}{24}) = 16 \times \frac{2+\sqrt{3}}{4} \times \frac{2}{4} \times \frac{1}{4} \times \frac{1}{4} = \frac{9+6\sqrt{2}}{16}$ ✓

(۲) ۷

$\frac{1-\sin x}{1+\sin x} = 4 \quad 1-\sin x = 4+4\sin x \quad 5\sin x = -3 \quad \sin x = -\frac{3}{5}$

$1-\sin^2 x = \cos^2 x \quad 1-\frac{9}{25} = \frac{16}{25} = \cos^2 x \quad \cos x = -\frac{4}{5}$

$\tan\frac{x}{2} = \frac{\sin x}{1+\cos x} = \frac{-\frac{3}{5}}{1-\frac{4}{5}} = \frac{-\frac{3}{5}}{\frac{1}{5}} = -3$ ✓

(۲) ۸

$\tan\frac{\alpha}{2} = \frac{\sin\theta}{1+\cos\theta} = \frac{1-\cos\theta}{\sin\theta} \Rightarrow \frac{1+\cos\theta}{\sin\theta} = \frac{1}{\tan\frac{\theta}{2}} = \cot\frac{\theta}{2}$

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

$\cot\frac{\theta}{2} + \cot\frac{\theta}{2} = 2\cot\frac{\theta}{2} = k\cot\frac{\theta}{2} \quad \boxed{k=2}$ ✓

(۲) ۹

$\cos(\frac{11\pi}{4} + \alpha) = \cos(\frac{3\pi}{4} + \alpha) = \cos\frac{3\pi}{4}\cdot\cos\alpha - \sin\frac{3\pi}{4}\cdot\sin\alpha$

$\cos\alpha = -\sqrt{1-\sin^2\alpha} = -\sqrt{1-0.5^2} = -\sqrt{0.75} = -\frac{\sqrt{3}}{2}$

$-\frac{\sqrt{2}}{2}\times\left(-\frac{\sqrt{3}}{2}\right) - \left(+\frac{\sqrt{2}}{2}\right)\left(\frac{\sqrt{2}}{2}\right) = \frac{\sqrt{3}}{2} \approx \frac{1}{2} = \boxed{0.4}$

(۱/۲۵) ۱۰

$\sin\frac{3\pi}{4}$ در ناحیه دوم مثبت است!