درس حسابان ۲۸ یازدهم دختر C

1) $\dfrac{1}{\sqrt{\cos^2\alpha}}$

$\dfrac{1}{\cot\alpha} = \dfrac{\sin\alpha}{\cos\alpha}$

$\dfrac{1}{|\cos\alpha|} - \dfrac{\sin\alpha}{\cos\alpha}$

$\cos\alpha > 0 \longrightarrow \dfrac{1-\sin\alpha}{\cos\alpha} = \dfrac{1-\sin\alpha}{\cos\alpha}$ ق ق $\longrightarrow \cos\alpha > 0$

$\cos\alpha < 0 \longrightarrow \dfrac{-1-\sin\alpha}{\cos\alpha} = \dfrac{\sin\alpha - 1}{\cos\alpha}$ غ ق ق

$\cot\alpha = \dfrac{\cos\alpha}{\sin\alpha} = \dfrac{\cos\alpha}{\sqrt{\sin^2\alpha}} = \dfrac{\cos\alpha}{|\sin\alpha|} \Rightarrow \sin\alpha = |\sin\alpha| \Rightarrow \sin\alpha > 0$ ناحیه اول

---

2) $-\dfrac{\pi}{12} < x < \dfrac{5\pi}{12} \longrightarrow -\dfrac{\pi}{6} < 2x < \dfrac{5\pi}{6}$

$A = 2x \longrightarrow -\dfrac{\pi}{6} < A < \dfrac{5\pi}{6} \longrightarrow -\dfrac{1}{2} < \sin\hat{A} \leq 1$

$-\dfrac{1}{2} < \dfrac{m-1}{4} \leq 1 \longrightarrow -2 < m-1 \leq 4 \longrightarrow -1 < m \leq 5 \Rightarrow m \in (-1, 5]$

---

3) $\dfrac{\sin x}{\cos x} + \dfrac{\cos x}{\sin x} = -3 \longrightarrow \sin x \times \cos x = -\dfrac{1}{3}$

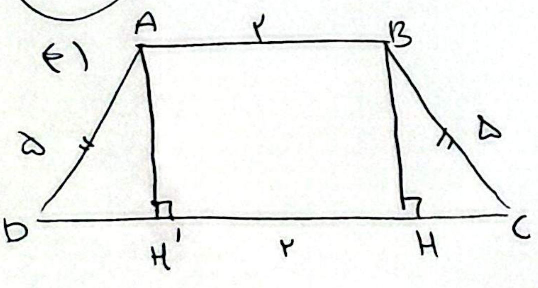
$2\sin x\cos x = -\dfrac{2}{3} \longrightarrow (\sin x + \cos x)^2 = 1 + 2\sin x\cos x = \dfrac{1}{3}$

$\dfrac{3\pi}{4} < x < \pi \longrightarrow \sin x + \cos x = -\dfrac{1}{\sqrt{3}}$

$\dfrac{1}{\sin^3 x + \cos^3 x} = \dfrac{1}{(\sin x + \cos x)(1 - \sin x\cos x)} = \dfrac{-\sqrt{3}}{\frac{4}{3}} = -0.75 \times \sqrt{3}$

---

4)




$B\hat{C}H = \cos\theta = \dfrac{CH}{BC} = \dfrac{CH}{5} = \dfrac{6}{10} \longrightarrow CH = 3$

$B\hat{C}H \cong A\hat{D}H' \Rightarrow DH' = CH = 3$

$ABHH' \longrightarrow HH' = 2 \longrightarrow CD = 2+3+3 = 8$

$B\hat{C}H = BH^2 = BC^2 - CH^2 = 25 - 9 = 16 \quad BH = 4$

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

۵) $\tan 285 \times \tan(-165) - \sin 1095 \times \cos 255 \rightarrow \cos(270-15)$

$\tan(270+15) \qquad \tan(-180+15) \qquad (1080+15),\ 1080 = 6\times 180$

$\boxed{-\cot 15 \times \tan 15 - \sin 15 \times (-\sin 15)}$

$-1+\sin^2 15 = -\cos^2 15$

$K=-1$

---

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

$A = \sqrt{3}\cos(180+30)\sin(270-27) - \sqrt{2}\sin(180-45)\cos(180-27)$

$A = \sqrt{3}\left(-\frac{\sqrt{3}}{2}\right)(-\cos 27^\circ) - \sqrt{2}\left(\frac{\sqrt{2}}{2}\right)(-\cos 27) \Rightarrow$

$A = \sqrt{3}\left(-\frac{\sqrt{3}}{2}\right) \longrightarrow \frac{3}{2}\cos 27^\circ + \cos 27^\circ = \frac{5}{2}\cos 27^\circ = 2/5\cos 27^\circ$

---

۷) $f\left(\frac{\pi}{24}\right) = 16\cos^2\left(\frac{2\pi}{24}\right)\cos^2\left(\frac{8\pi}{24}\right)\cos^2\left(\frac{16\pi}{24}\right)\cos^2\left(\frac{24\pi}{24}\right) \Rightarrow$

$16\cos^2\left(\frac{\pi}{12}\right)\cos^2\left(\frac{\pi}{3}\right)\cos^2\left(\frac{2\pi}{3}\right)$

$\cos^2\alpha = \frac{1+\cos 2\alpha}{2} \qquad \cos^2\left(\frac{\pi}{12}\right) = \frac{1+\cos\left(\frac{\pi}{6}\right)}{2} = \frac{1+\frac{\sqrt{3}}{2}}{2} = \frac{2+\sqrt{3}}{4}$

$16\left(\frac{2+\sqrt{3}}{4}\right)\left(\frac{\sqrt{3}}{2}\right)^2\left(\frac{1}{2}\right)^2\left(-\frac{1}{2}\right)^2 = 16\left(\frac{2+\sqrt{3}}{4}\right)\left(\frac{3}{4}\right)\left(\frac{1}{4}\right)\left(\frac{1}{4}\right) = \frac{3(2+\sqrt{3})}{16} = \frac{6+3\sqrt{3}}{16}$

---

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

$\sin^2 x + \cos^2 x = 1 \rightarrow \cos^2 x = 1-\sin^2 x = 1-\frac{9}{25} = \frac{16}{25} \xrightarrow{\cos x<0} -\frac{4}{5} \rightarrow \cos x$

$\tan x = \frac{-\frac{3}{5}}{-\frac{4}{5}} = \frac{3}{4},\quad \tan x = \frac{2\tan\frac{x}{2}}{1-\tan^2\frac{x}{2}} \longrightarrow \frac{2\tan\frac{x}{2}}{1-\tan^2\frac{x}{2}} = \frac{3}{4}$

$3-3\tan^2\frac{x}{2} \rightarrow 8\tan\frac{x}{2} \rightarrow 3\tan^2\frac{x}{2} + 8\tan\frac{x}{2} - 3 = 0$

$\Delta = 100 \longrightarrow \tan\frac{x}{2} = \frac{-8+10}{6} = \frac{1}{3}$

$\tan\frac{x}{2} = \frac{-8-10}{6} = -\frac{18}{6} = -3 \quad \Big\}\ \tan\frac{x}{2} = -3$

۹) $\dfrac{\sin^{۲}\theta + (1-\cos^{۲}\theta)}{(1-\cos\theta)\sin\theta} = \dfrac{۲\sin\theta}{\sin\theta(1-\cos\theta)} = \dfrac{۲\times۲ \times \sin(\frac{\theta}{۲}) \times \cos(\frac{\theta}{۲})}{۲\sin^{۲}\frac{\theta}{۲}} = ۲\cot\frac{\theta}{۲}$

$K = ۲$

---

۱۰) $\cos\left(\dfrac{۱۱\pi}{۴} + \alpha\right) = -\left(\cos\alpha\cos\dfrac{\pi}{۴} + \sin\alpha\sin\dfrac{\pi}{۴}\right)$

$\rightarrow -\dfrac{\sqrt{۲}}{۲}(\cos\alpha + \sin\alpha)$ $\qquad \cos\alpha = -\dfrac{۷\sqrt{۲}}{۱۰}$

$\hookrightarrow -\dfrac{\sqrt{۲}}{۲}\left(-\dfrac{۷\sqrt{۲}}{۱۰} + \dfrac{\sqrt{۲}}{۱۰}\right) = \dfrac{۳}{۵}$

CamScanner