Subject:
Year: Month: Day: ترم کسائیان* تکلیف ۲۸: page: ( )

(۱)

$\cot a = \dfrac{\cos a}{\underbrace{\sqrt{1-\cos^2 a}}_{\text{همواره مثبت}}} \longrightarrow$ ناحیه اول یا دوم $\qquad \dfrac{1}{\sqrt{\cos^2 a}} - \dfrac{1}{\cot a} = \dfrac{1-\sin a}{|\cos a|}$

$\dfrac{1}{|\cos a|} - \dfrac{\sin a}{\cos a} = \dfrac{1-\sin a}{|\cos a|}$

$\xrightarrow{\cos a > 0} \dfrac{1-\sin a}{\cos a} = \dfrac{1-\sin a}{\cos a}$ ✓ $\longrightarrow$ ناحیه اول

$\xrightarrow{\cos a < 0} \dfrac{-1-\sin a}{\cos a} = \dfrac{\sin a - 1}{\cos a}$ ✗

---

(۲)

$-\dfrac{\pi}{4} < 2x < \dfrac{5\pi}{4} \longrightarrow -\dfrac{1}{2} < \sin 2x \leq 1 \longrightarrow$

$-2 < x-1 \leq 4 \longrightarrow -1 < x \leq 5 \longrightarrow \boxed{x \in (-1, 5]}$

---

(۳)

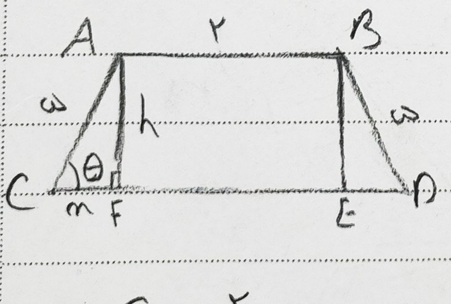
$\tan x + \cot x = \dfrac{1}{\cos x \sin x} = -3 \longrightarrow \cos^3 x + \sin^3 x = (\cos x + \sin x)(\underbrace{\cos^2 x + \sin^2 x}_{1} - \sin x \cos x)$

$\longrightarrow \dfrac{1}{\cos^3 x + \sin^3 x} = \dfrac{1}{(\cos x + \sin x)\left(\frac{4}{3}\right)} = A \xrightarrow{\text{توان ۲}} A^2 = \dfrac{9}{16(\underbrace{\cos^2 x + \sin^2 x}_{1} + \underbrace{2\cos x \sin x}_{-\frac{2}{3}})} \Rightarrow$

$A^2 = \dfrac{9}{\frac{16}{3}} = \dfrac{27}{16} \longrightarrow A = \boxed{\dfrac{3\sqrt{3}}{4}}$

---

(۴)



$\cos\theta = \dfrac{x}{5} = \dfrac{6}{10} \longrightarrow x = 3$

$\longrightarrow 5^2 = 3^2 + h^2 \longrightarrow h = 4 \longrightarrow \hat{C} = \hat{D} \longrightarrow$

$CF = ED = 3,\ BE = AF = 4 \longrightarrow ABEF$ مستطیل

$\longrightarrow AB = FE = 2 \longrightarrow$ قاعده بزرگ $= 8 \longrightarrow S = \dfrac{8+2}{2} \times 4$

$\longrightarrow \boxed{S = 20}$

---

(۵)

$\tan\left(\dfrac{3\pi}{2} + 15\right) \times \tan(\pi + 15) - \left(\sin(2\pi + 15) \times \cos\left(\dfrac{3\pi}{2} - 15\right)\right)$

$(\underbrace{\cancel{-\cot 15 \times \tan 15}}_{-1}) - (\sin 15 \times -\sin 15) = \sin^2 15 - 1 = -\cos^2 15 \longrightarrow$

$\boxed{K = -1}$

Date: Subject: ادامهٔ ریاضیا

$$A = \sqrt{۳} \times -\frac{\sqrt{۳}}{۲} \times \sin\left(\frac{۳\pi}{۲} - ۲۷\right) - \left(\sqrt{۲} \times \frac{\sqrt{۲}}{۲} \times \cos(\pi - ۲۷)\right)$$ ⑥

$$\rightarrow A = +\frac{۳}{۲}\cos ۲۷ - (-\cos ۲۷) = \frac{۵}{۲}\cos ۲۷ \rightarrow \boxed{\frac{۵}{۲}\ \text{برابر}}$$

---

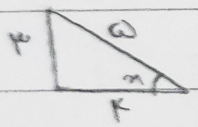
⑦

$$f\left(\frac{\pi}{۴۸}\right) = ۱۶\cos^۲\left(\frac{\pi}{۱۲}\right) \times \cos^۲\left(\frac{\pi}{۶}\right) \times \cos^۲\left(\frac{\pi}{۳}\right) \times \cos^۲\left(\frac{۲\pi}{۳}\right) \times \frac{\sin^۲\left(\frac{\pi}{۱۲}\right)}{\sin^۲\left(\frac{\pi}{۱۲}\right)} =$$

$$\sin^۲\left(\frac{\pi}{۱۲}\right) \times \cos^۲\left(\frac{\pi}{۱۲}\right) = \frac{۱}{۴}\sin^۲\left(\frac{\pi}{۶}\right) \rightarrow \frac{\cancel{۱۶} \times \frac{۱}{۱۶^۲}\sin^۲\left(\frac{۴\pi}{۳}\right)}{\sin^۲\left(\frac{\pi}{۱۲}\right)} = \frac{۱}{۱۶} \cdot \frac{\frac{۳}{۴}}{\frac{۱-\cos ۳۰ \rightarrow \frac{\sqrt{۳}}{۲}}{۲}} = \frac{\frac{۳}{\cancel{۴}}}{\frac{\frac{۲-\sqrt{۳}}{۲}}{\frac{۲}{۱}}} = \frac{۳}{۲-\sqrt{۳}}$$

$$\frac{۲-\sqrt{۳}}{\cancel{۴}} \qquad \frac{۹+۳\sqrt{۳}}{۱۶} =$$

$$۱ - \sin x = ۴ + ۴\sin x \rightarrow ۵\sin x = -۳ \rightarrow \sin x = \frac{-۳}{۵}$$ ⑧



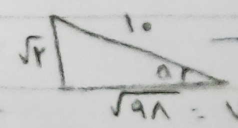
$$\tan\left(\frac{x}{۲}\right) = \frac{\sin\left(\frac{x}{۲}\right)}{\cos\left(\frac{x}{۲}\right)} = \sqrt{\frac{۱-\cos x}{۱+\cos x}} \times \frac{\sqrt{۱-\cos x}}{\sqrt{۱-\cos x}} = \frac{|۱-\cos x|}{|\sin x|} = -\frac{۱-\cos x}{\sin x}$$

$$\rightarrow \tan\left(\frac{x}{۲}\right) = -\frac{\frac{۵+۴}{۵}}{-\frac{۳}{۵}} = \boxed{۳}$$

$$\frac{\sin\theta}{۱-\cos\theta} + \frac{۱+\cos\theta}{\sin\theta} = \frac{\sin^۲\theta + ۱ - \cos^۲\theta}{(۱-\cos\theta)(\sin\theta)} = \frac{\cancel{۲}\sin^۲\theta}{(\cancel{۲}\sin^۲\frac{\theta}{۲})(\sin\theta)}$$ ⑨

$$\frac{\sin\theta}{\sin^۲\frac{\theta}{۲}} = \frac{۲\sin\frac{\theta}{۲}\cos\frac{\theta}{۲}}{\sin^۲\frac{\theta}{۲}} = ۲\cot\frac{\theta}{۲} \rightarrow \boxed{K = ۲}$$

$$\frac{۱۱\pi}{۴} = \frac{۳\pi}{۴} \rightarrow \cos\left(\frac{۳\pi}{۴} + a\right) = \cos\frac{۳\pi}{۴}\cos a - \sin\frac{۳\pi}{۴}\sin a$$ ⑩



$$\rightarrow \cos a = \frac{-۷\sqrt{۲}}{۱۰} \qquad \sin a = \frac{\sqrt{۲}}{۱۰}$$

$$\rightarrow -\frac{\sqrt{۲}}{۲} \times \frac{-۷\sqrt{۲}}{۱۰} - \left(\frac{\sqrt{۲}}{۲} \times \frac{\sqrt{۲}}{۱۰}\right) = \frac{۱۴-۲}{۲۰} \qquad \boxed{\frac{۳}{۵}}$$