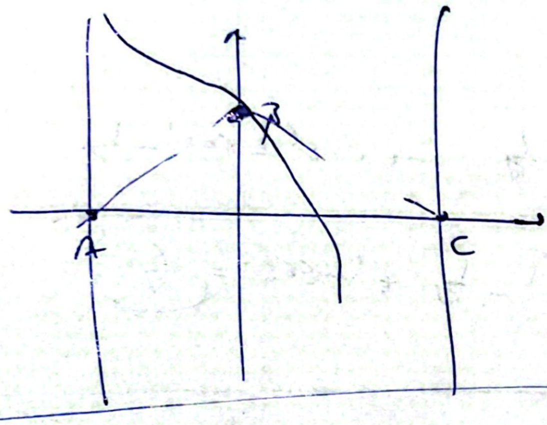
حل مسائل - دوازدهم

سوال ۱



$\lim_{x} \to \tan(\frac{\pi}{4}) = 1$

مساحت $= \frac{1 \times \frac{\pi}{2}}{2} = \frac{\pi}{4}$

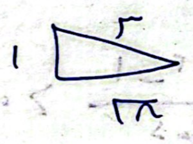
سوال ۲

$\frac{4}{9} - \frac{2}{3}\sin\alpha - \frac{1}{4}(1-\sin^2)$

$\frac{\sin^2}{4} - \frac{2}{3}\sin\alpha + \frac{7}{36}$

$9\sin^2 - 24\sin + 7 = 0 \quad \sqrt{\Delta} = 18$

$\frac{24+18}{18} = \frac{24-18}{18} = \frac{1}{3}$



$\sin = \frac{1}{3}$

$\cos = \frac{\sqrt{8}}{3}$

$9\sin^2 - 24\sin + 7 = 0$

$1 + \tan^2 = \frac{1}{\cos^2}$ $\quad \frac{9}{8}$

سوال ۳

$\log(\sin x) - \log(-\cos x) = \log 3$

$\frac{\sin}{-\cos} = 3 \to \sin = -3\cos$

$\sin^2 + \cos^2 = 1 \quad 9\cos^2 + \cos^2 = 1$

$\cos^2 = \frac{1}{10} \quad \cos = \frac{1}{\sqrt{10}}$

$\sin = -\frac{3}{\sqrt{10}}$

$\sin - \cos = -\frac{3}{\sqrt{10}} - \frac{1}{\sqrt{10}} = -\frac{4}{\sqrt{10}} = -\frac{2\sqrt{10}}{5}$

(سوال ۴)

$\sin^4 + \cos^2 = \frac{4}{5}$

$\downarrow$

$(1-\cos^2)^2$

$\cos^4 + 1 - 2\cos^2 + \cos^2 = \frac{4}{5} \rightarrow \cos^4 = \cos^2 - \frac{1}{5}$

$\cos^4 + \sin^2$

$\downarrow$

$1 - \cos^2$

$\rightarrow \cancel{\cos^2} - \frac{1}{5} + 1 - \cancel{\cos^2} = \frac{4}{5}$

(سوال ۷)

$\frac{3\sin + \sin\cos}{2(1-\cancel{\cos^2})} < 0$

$\sin^2$

$\frac{\sin(\overbrace{3 + \cos}^{+})}{2\sin^2} < 0 \rightarrow \sin -$

$\sin \alpha \frac{\sin}{\cos} - \frac{1}{\cos} > 0$

ناحیه سوم

$\frac{\sin^2 - 1}{\cos} > 0 \quad \frac{-\cos^2}{\cos} > 0 \quad \cos -$

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سوال ۹

$$\frac{2}{\sin} = -\frac{3}{\cos}$$

$$\frac{\sin}{\cos} = -\frac{2}{3}$$

$$\sin = -\frac{2}{3}\cos$$

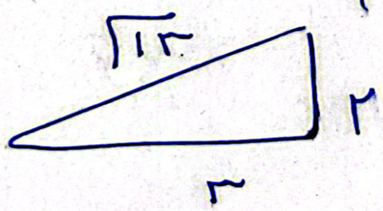
$$\sin^2 + \cos^2 = 1$$

$$\frac{4}{9}\cos^2 + \cos^2 = 1$$

$$\frac{13\cos^2}{9} = 1$$

$$\cos^2 = \frac{9}{13}$$

$$\cos = \frac{3}{\sqrt{13}}$$



$$\sin = \frac{-2}{\sqrt{13}}$$

$$\frac{2\cos + 3\sin}{\sin\cos} = 0$$

$$\frac{\sin}{\cos} + \frac{\cos}{\sin} \rightarrow \frac{\sin^2 + \cos^2}{\cancel{\sin\cos}}$$

$$\frac{1}{2}\sin 2\alpha$$

$$\frac{2}{\sin 2\alpha} ?$$

$$\frac{\cancel{2}}{\cancel{2} \times \frac{3}{\sqrt{13}} \times \frac{-2}{\sqrt{13}}} = \frac{-13}{6}$$

$$\cos 2\alpha = 2\cos^2 - 1$$

$$\cos 40 = 2\cos^2 20 - 1 \longrightarrow \cos 40 + 1 = 2\cos^2 20$$

$$\sqrt{1 + \sin 50} \longrightarrow \sqrt{1 + \cos 40} \longrightarrow \sqrt{2\cos^2 20} \to \sqrt{2}\cos 20$$

$$\frac{}{\sin 50 + \sin 10} \longrightarrow \frac{}{\underline{\cos 40} + \cos 80}$$

$$\cos 80 = 2\cos^2 40 - 1 \qquad 2\cos^2 40 + \cos 40 - 1$$

$$(\cos + 2)(\cos - 1)$$

$$-2 \qquad 1$$

$$-\frac{2}{2} \qquad \frac{1}{2}$$

$$(1-\cancel{٢\sin^2 ٥})(\cancel{٢\cos^2 ١٠-1})\left(\cancel{\frac{1-\tan^2 ٢٠}{1+\tan^2 ٢٠}}\right)$$

(٨ب)

$$\cos ١٠ \qquad \cos ٢٠ \qquad \cos ٤٠$$

$$\frac{\overset{\overset{\frac{1}{٢}\sin ٢٠}{}}{\sin ١٠\,\cos ١٠}\;\overset{\frac{1}{٤}\sin ٤٠}{\cos ٢٠}\;\cos ٤٠}{\sin ١٠} \qquad \frac{1}{٨}\sin ٨٠$$

$$=\frac{\frac{1}{٨}\sin ٨٠}{\sin ١٠}=\frac{\frac{1}{٨}\cos ١٠}{\sin ١٠}=\boxed{\frac{1}{٨}\cot ١٠}$$

(سوال ۹)

$$\sin + 3\cos = 2 \longrightarrow \sin = 2 - 3\cos$$

$$\cos^2 + \sin^2 = 1 \longrightarrow (2 - 3\cos)^2 + \cos^2 = 1$$

$$9\cos^2 - 12\cos + \cos^2 + 4 = 0$$

$$\boxed{10\cos^2 - 12\cos + 3 = 0} \longrightarrow 10\cos^2 - 12\cos = -3$$

$$5\cos 2x - 12\cos x \ ?$$

$$5(2\cos^2 - 1) - 12\cos \longrightarrow \underbrace{\cancel{10\cos^2} - 5 - \cancel{12\cos}}_{-3} = ?$$

$$-8$$

سوال ۱۰

$\sin B \sin C = \cos^{۲}\frac{A}{۲} \qquad B = ۷۲ \qquad A\ ?$

$A + B + C = ۱۸۰ \qquad B = ۷۲ \rightarrow A + C = ۱۸۰ - ۷۲ = ۱۰۸$

$C = ۱۰۸ - A$

$\sin ۷۲ \sin(۱۰۸ - A) = \cos^{۲}\frac{A}{۲}$

$\frac{۱}{۲}\left[\cos(A - ۳۶) - \underbrace{\cos(۱۸۰ - A)}_{-\cos A}\right] = \cos^{۲}\frac{A}{۲}$

$\frac{۱}{۲}\left[\cos(A - ۳۶) + \cos A\right] = \cos^{۲}\frac{A}{۲} = \frac{۱ + \cos A}{۲}$

$\cos(A - ۳۶) + \cos A = ۱ + \cos A$

$\cos(A - ۳۶) = ۱$

$A - ۳۶ = ۰ \qquad A = ۳۶$