پارمیس نبی زاده ، دوازدهم دختر B   تکلیف شماره ۱۵

(۱
$$x_C - x_A = T = \frac{\pi}{|-2|} = \frac{\pi}{2}$$
$$(0, B) \to B = \tan\left(0+\frac{\pi}{4}\right) = 1$$
$$S_{\overset{\Delta}{ABC}} = \frac{1}{2} \times \frac{\pi}{2} \times 1 = \frac{\pi}{4} = 0/78$$

(۲
$$\left(\frac{2}{3}, 0\right) \to \frac{4}{9} - \frac{2}{3}\sin\alpha - \frac{1}{4}(1-\sin^2\alpha) = 0$$
$$\left(\frac{1}{4}\sin^2\alpha - \frac{2}{3}\sin\alpha + \frac{7}{36} = 0\right)\times 36 \to 9\sin^2\alpha - 24\sin\alpha + 7 = 0$$
روسی $\Rightarrow \sin^2\alpha - 24\sin\alpha + 63 = 0$ $(\sin\alpha - 3)(\sin\alpha - 21) = 0$

$\sin\alpha = \frac{1}{3}, \frac{7}{3} \to$ غ ق ق $\Rightarrow \sin\alpha = \frac{1}{3}, \cos\alpha = \frac{\sqrt{8}}{3}$
$$1+\tan^2\alpha = \frac{1}{\cos^2\alpha} = \frac{1}{\frac{8}{9}} = \frac{9}{8}$$

(۳
$$\log^{\sin\alpha} - \log^{-\cos\alpha} = \log^{\frac{\sin\alpha}{-\cos\alpha}} = \log^{3}$$
$\Rightarrow \tan\alpha = -3$ $\log^{\sin\alpha} \to \sin\alpha > 0$ $\log^{-\cos\alpha} \to \cos\alpha < 0$

$1+\tan^2 = \frac{1}{\cos^2\alpha} \Rightarrow \cos\alpha = \frac{-1}{\sqrt{10}}$ $\sin\alpha = \frac{3}{\sqrt{10}}$
$$\sin\alpha - \cos\alpha = \frac{3}{\sqrt{10}} - \left(\frac{-1}{\sqrt{10}}\right) = \frac{4}{\sqrt{10}} = \frac{4\sqrt{10}}{10} = \frac{\sqrt{10}}{2/5}$$

(۴
$$\sin^4\theta + \cos^2\theta = \sin^4\theta + (1-\sin^2\theta) = \frac{4}{5}$$
$$\sin^4\theta - \sin^2\theta + \frac{1}{5} = 0 \to 5\sin^4\theta - 5\sin^2\theta + 1 = 0$$
$\sin^2\theta = \frac{5 \pm \sqrt{5}}{10}$ فرض $\to \sin^2\theta = \frac{5+\sqrt{5}}{10}$
$$\cos^2\theta = 1 - \frac{5+\sqrt{5}}{10} = \frac{5-\sqrt{5}}{10} \Rightarrow \cos^4\theta = \frac{30-10\sqrt{5}}{100} = \frac{3-\sqrt{5}}{10}$$
$$\cos^4\theta + \sin^2\theta = \frac{3-\sqrt{5}}{10} + \frac{5+\sqrt{5}}{10} = 0/8$$

$$\frac{\sin x\,(3+\cos x)}{2(\underbrace{1-\cos^2 x}_{\sin^2 x})} = \frac{(\overset{+}{3+\cos x})}{2\sin x} < 0 \Rightarrow \sin x < 0 \quad (5$$

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

$$\Rightarrow \cos x < 0$$

کمان در ناحیه سوم دایره مثلثاتی قرار دارد

$$\frac{2\cos x + 3\sin x}{\sin x\cos x} = 0 \Rightarrow 2\cos x + 3\sin x = 0 \quad (6$$

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

$$\sin^2 x + \cos^2 x = \sin^2 x + \frac{9}{4}\sin^2 x = 1 \Rightarrow \frac{13}{4}\sin^2 = 1$$

$$\sin^2 x = \frac{4}{13} \Rightarrow \sin x = \pm\frac{2}{\sqrt{13}}$$

$$\cos^2 x = \frac{9}{13} \Rightarrow \cos x = \pm\frac{3}{\sqrt{13}}$$

$$\tan x + \cot x = \frac{1}{\sin x\cos x} = \frac{1}{\frac{2}{\sqrt{13}}\times\frac{3}{\sqrt{13}}} = \frac{13}{6}$$

$$\sqrt{1+\sin 50} = \sqrt{1+2\sin 25\cos 25} = |\sin 25 + \cos 25| \quad (7$$

$$\sin 50 + \sin 10 = 2\sin 30 \times \cos 20 = 2\times\frac{1}{2}\times\cos 20$$

$$\Rightarrow \frac{\sin 25 + \cos 25}{\cos 20} = \frac{\sqrt{2}\left(\frac{1}{\sqrt{2}}\sin 25 + \frac{1}{\sqrt{2}}\cos 25\right)}{\cos 20}$$

$$= \frac{\sqrt{2}\,(\sin(25+45))}{\cos 0} = \frac{\sqrt{2}\times\cancel{\sin 70}}{\cancel{\cos 20}} = \sqrt{2}$$

$$1 - 2\sin^2 5 = \cos^2 5 - \sin^2 5 = \cos 10 \quad (8$$

$$2\cos^2 10 - 1 = \cos^2 10 - \sin^2 10 = \cos 20$$

$$\frac{1-\tan^2 20}{1+\tan^2 20} = \frac{\cos^2 20 - \sin^2 20}{\cos^2 20 + \sin^2 20} = \cos^2 20 - \sin^2 20 = \cos 40$$

$$\cos 10\,[\cos 20 \times \cos 40] = \cos 10\left[\frac{1}{2}\times\cos 60\times\cos 20\right]$$

$$= \frac{1}{4}\cos 10\times\cos 20 = \frac{1}{4}\left[\frac{1}{2}\cos 30\times\cos 10\right] = \frac{\sqrt{3}}{16}\cos 10$$

$$\sin\alpha = ۲ - ۳\cos\alpha \qquad (۹$$

$$\sin^۲\alpha + \cos^۲\alpha = ۴ + ۹\cos^۲\alpha - ۱۲\cos\alpha + \cos^۲\alpha = 1$$

$$\Rightarrow ۱۲\cos\alpha = ۱۰\cos^۲\alpha + ۳$$

$$۵\cos ۲\alpha - ۱۲\cos\alpha = ۵\cos^۲\alpha - ۵\sin^۲\alpha - ۱۲\cos\alpha$$

$$= ۵\cos^۲\alpha - ۵\sin^۲\alpha - ۱۰\cos^۲\alpha - ۳ = -۵\cos^۲\alpha - ۵\sin^۲\alpha - ۳$$

$$-۵(\cos^۲\alpha + \sin^۲\alpha) - ۳ = -۵(۱) - ۳ = -۸$$

$$B = ۷۲ \qquad A + ۷۲ + C = ۱۸۰ \Rightarrow C = ۱۸۰ - ۷۲ - A \qquad (۱۰$$

$$(\sin ۷۲)(\sin ۱۰۸ - A) = \cos^۲\frac{A}{۲} = \frac{1 + \cos A}{۲}$$

$$\Rightarrow ۲(\sin ۷۲)(\sin ۱۰۸ - A) = ۱ + \cos A$$

$$\cancel{۲}\left[\frac{۱}{\cancel{۲}}\left((\cos A - ۳۶) - \cos(۱۸۰ - A)\right)\right] = ۱ + \cos A$$

$$\Rightarrow \cos(A - ۳۶) + \cos A = ۱ + \cos A$$

$$\Rightarrow \cos(A - ۳۶) = ۱ \qquad A - ۳۶ = ۰ \qquad A = ۳۶$$