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A | $\cos(\frac{\pi}{2}-\alpha) = \sin\alpha$, $\sin(\frac{\pi}{2}-\alpha) = \cos\alpha$

B | $1 + \tan(\frac{\pi}{2}-\alpha) = \cot\alpha$

$AB = \sqrt{(\sin\alpha - 1)^2 + (\cos\alpha - \cot\alpha)^2}$

$\sin^2\alpha + 1 - 2\sin\alpha$

$(\cos\alpha - \frac{\cos\alpha}{\sin\alpha})^2 = (\frac{\cos\alpha\sin\alpha - \cos\alpha}{\sin\alpha})^2 = (\frac{\cos\alpha(\sin\alpha - 1)}{\sin\alpha})^2$

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$= \frac{\cos^2\alpha(\sin^2\alpha + 1 - 2\sin\alpha)}{\sin^2\alpha} = \frac{1-\sin^2\alpha(\sin^2\alpha + 1 - 2\sin\alpha)}{\sin^2\alpha}$

$= \sqrt{\frac{\sin^2\alpha(\sin^2\alpha + 1 - 2\sin\alpha) + (1-\sin^2\alpha)(\sin^2\alpha + 1 - 2\sin\alpha)}{\sin^2\alpha}} = \sqrt{(\frac{\sin\alpha - 1}{\sin\alpha})^2} = |\frac{\sin\alpha - 1}{\sin\alpha}|$

$A = \frac{1}{\sin\alpha} - 1$

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$\frac{\frac{\sqrt{2}}{2}}{4} = \frac{\sin(135-\alpha)}{AB} \Rightarrow AB = \frac{4\sin\alpha}{\sqrt{2}}$

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$\frac{1}{2} = \frac{\sin\alpha}{AC} \Rightarrow AC = 4\sin\alpha$

$\frac{AB}{AC} = \frac{\frac{4\sin\alpha}{\sqrt{2}}}{4\sin\alpha} = \frac{4}{4\sqrt{2}} = \frac{2}{\sqrt{2}} = \frac{2\sqrt{2}}{2} = \sqrt{2}$

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$AB = \sqrt{(\frac{1}{2} - (-\frac{\sqrt{2}}{2}))^2 + (\frac{\sqrt{2}}{2} - \frac{1}{2})^2} = \sqrt{\frac{1 + 2\sqrt{2} + 2 + 2 + 1 - 2\sqrt{2}}{4}} = \sqrt{2}$

$AC = \sqrt{(\frac{1}{2} - 0)^2 + (\frac{\sqrt{2}}{2} - (-1))^2} = \sqrt{\frac{1}{4} + \frac{2 + 2 + 2\sqrt{2}}{4}} = \sqrt{2 + \sqrt{2}}$

$BC = \sqrt{(-\frac{\sqrt{2}}{2} - 0)^2 + (\frac{1}{2} - (-1))^2} = \sqrt{\frac{2+9}{4}} = \sqrt{2}$

$\sin^2 75 = \frac{1 - \cos 150}{2} \Rightarrow \sin^2 75 = \frac{1 - (-\frac{\sqrt{2}}{2})}{2} = \frac{1 + \frac{\sqrt{2}}{2}}{2} = \frac{2+\sqrt{2}}{4} \Rightarrow \sin 75 = \sqrt{\frac{2+\sqrt{2}}{4}}$

$= \frac{\sqrt{2+\sqrt{2}}}{2} = \hat{B}$

$S = \frac{1}{2} \times \frac{\sqrt{2+\sqrt{2}}}{2} \times \sqrt{2} \times \sqrt{2} = \frac{\sqrt{4} \times \sqrt{2+\sqrt{2}}}{4} = \frac{\sqrt{12 + 4\sqrt{2}}}{4} = \frac{\sqrt{(2+\sqrt{2})^2}}{4}$

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$= \frac{2+\sqrt{2}}{4}$

$P = \sqrt{2 + \sqrt{2} + \sqrt{2} + \sqrt{2}}$

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$a^2 = b^2 + c^2 - 2bc\cos A \Rightarrow c^2 - \sqrt{2}bc + b^2 - a^2 = 0$ — ۲

$c = \dfrac{\sqrt{2}b \pm \sqrt{4a^2 - b^2}}{2}$ $\quad S = \frac{1}{2} \times \sin A \times b \times c = \dfrac{b^2\sqrt{2} \pm b\sqrt{4a^2 - b^2}}{4}$

$S = \frac{1}{2} \times AB \times AC \times \sin 30 = \frac{1}{2} \times \log_2^3 \times \log_3^4 \times \frac{1}{2} = 3$

$2\cos^4\alpha - \cos^2\alpha - 2\sin^2\alpha + \sin^2\alpha = \dfrac{\cos^2\alpha(2\cos^2\alpha - 1)}{\cos 2\alpha} - \dfrac{\sin^2\alpha(2\sin^2\alpha - 1)}{-\cos 2\alpha}$ — ۵ — ۲

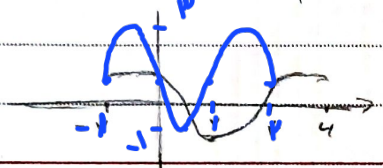
$= \cos^2\alpha \times \cos 2\alpha + \sin^2\alpha \times \cos 2\alpha = \cos 2\alpha(\cos^2\alpha + \sin^2\alpha) = \cos 2\alpha = 1 \Rightarrow \sin 2\alpha = \pm\sqrt{1 - \cos^2 2\alpha}$

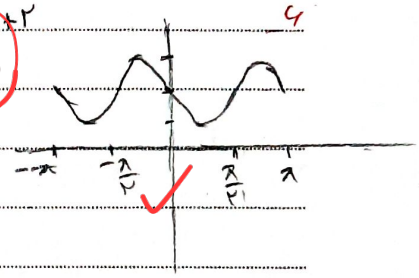
$= 0$ ✓

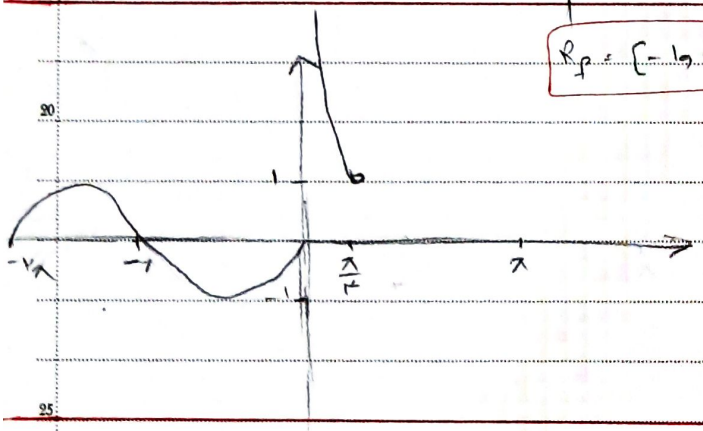
۴) $T = \dfrac{2\pi}{|b|} = \dfrac{2\pi}{2} = \pi$ ✓ $\quad y = -2\sin\pi x\cos\pi x + 2 \Rightarrow y = -\sin 2\pi x + 2$ — ۶ — ۱٫۵

$y = 2\cos\pi\left(x + \frac{1}{2}\right) + 1 = 2\cos\left(\pi x + \frac{\pi}{2}\right) + 1 = -2\sin\pi x + 1$

$T = \dfrac{2\pi}{|b|} = \dfrac{2\pi}{\pi} = 2$ ✓







$R_f = (-1, +\infty)$ — ۷ — ۲

$f(x) = b\sin(\pi x)\cdot\cos(\pi x)\cdot\cos(2\pi x) + a \Rightarrow f(x) = \frac{b}{4}\sin(4\pi x) + a$ — ۸

$\frac{1}{2}\sin(2\pi x)$ $\quad \frac{1}{2}\sin(4\pi x)$

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$\Rightarrow \left|\frac{b}{4}\right| + a = 4$ $\quad a = 2$

$-\left|\frac{b}{4}\right| + a = 0$ $\quad |b| = 8$

$T = \frac{\pi}{2} - \frac{\pi}{10} = \frac{4\pi}{10} = \frac{2\pi}{|c|} \Rightarrow |c| = 5$

$c = \frac{5}{2}$

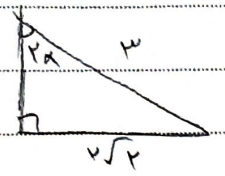
$\Rightarrow b = 8$

$\frac{bc}{a} = \frac{8 \times \frac{5}{2}}{2} = 10$ ✓

Arman

۹- $\frac{۲۸}{|۱۰|} = \frac{۲\pi}{\pi} = ۲ \Rightarrow f(x) = -۳\cos ۲x - ۱ \Rightarrow f(\alpha) = -۳\cos ۲\alpha - ۱ = ۰$

$\Rightarrow \cos ۲\alpha = \frac{-۱}{۳}$



$|\tan ۲\alpha| = \frac{۲\sqrt{۲}}{۱}$ ✓ ۲

۱۰- $T = ۳ \Rightarrow f(x) = f(x+۳) \Rightarrow -۱ \leq -۳۴,۵ + ۳\alpha < ۲ \Rightarrow ۳۳,۵ \leq ۳\alpha < ۳۶,۵$

$\Rightarrow \frac{۳۳,۵}{۳} \leq \alpha < \frac{۳۶,۵}{۳} \Rightarrow \alpha = ۱۲$

$f(-۳۴,۵ + ۳\alpha) = f(-۳۴,۵ + ۳۶) = f(۱,۵) \quad f(۱,۵) = \frac{۱}{۴}$ ✓ ۲