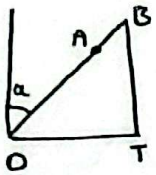
-۱

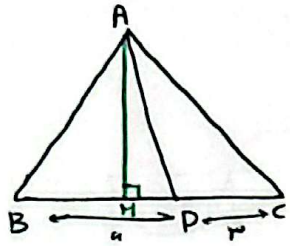


$TB = Tan\left(\frac{\pi}{2} - \alpha\right) = \cot(\alpha)$

$\rightarrow OB^2 = OT^2 + BT^2 \Rightarrow OB^2 = 1 + \cot(\alpha)^2 = \frac{1}{\sin^2\alpha} \Rightarrow OB = \frac{1}{\sin\alpha}$

$AB = OB - 1 = \frac{1}{\sin^2\alpha} - 1 \Rightarrow AB = \frac{1-\sin\alpha}{\sin\alpha}$

-۲



$\frac{S_{ABP}}{S_{APC}} = \frac{\frac{1}{2}AH \cdot BP}{\frac{1}{2}AH \cdot PC} = \frac{2}{3}$

$\frac{S(ABD)}{S(ADC)} = \frac{\frac{1}{2} \times AB \times AD \times \frac{\sqrt{2}}{2}}{\frac{1}{2} \times AC \times AD \times \frac{1}{2}} = \frac{AB\sqrt{2}}{AC} \Rightarrow \sqrt{2} = AB/AC$

$S_T = S_1 + S_2 + S_3$

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$S = \frac{1}{2}\left(10S_{\frac{\pi}{4}}^2\right)\left(\log_{\sqrt{3}}^{14}\right)\left(\sin\frac{\pi}{6}\right) = \frac{1}{2} \times \frac{1}{2} \times 2 \times 2 = \frac{3}{2}$

-۵

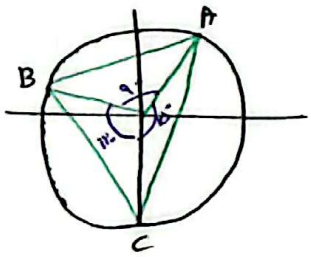
$2\cos^4 - \cos^2 - 2\sin^4 + \sin^2 = 1$

$2\left(\frac{\cos^4 - \sin^4}{\cos^2 - \sin^2}\right) + \sin^2 - \cos^2$

$\rightarrow 2\cos^2 - 2\sin^2 + \sin^2 - \cos^2$

$\cos^2 - \sin^2 = 1 \rightarrow \cos 2\alpha = 1 \Rightarrow \sin 2\alpha = 0$

-۳



$S_T = S_1 + S_2 + S_3 \quad (S_T) = \frac{1}{2} \times 1 \times 1 + \frac{1}{2} \times 1 \times 1 \times \frac{1}{2} + \frac{\frac{1}{2} \times 1 \times 1 \times \frac{\sqrt{3}}{2}}{\frac{\sqrt{3}}{4}}$

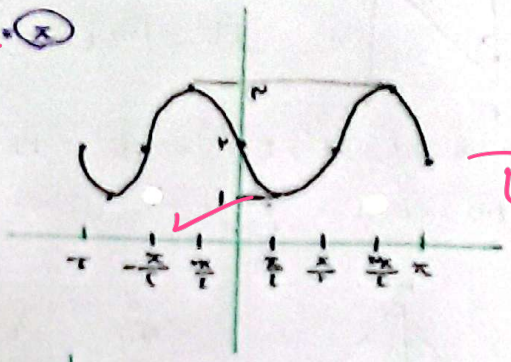
$\frac{3+\sqrt{3}}{4}$

$AC^2 = 1+1+2\times1\times1\times\frac{\sqrt{3}}{2} = \sqrt{2+\sqrt{3}} \quad AB = \sqrt{2} \quad B^2 = 1+1+2\times1\times1\times\frac{1}{2}\sqrt{2}$

$P = \sqrt{2+\sqrt{3}} + \sqrt{2} + \sqrt{2}$

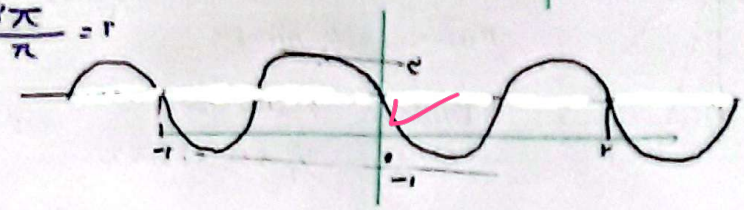
$-2\sin\alpha\cos\alpha + 2$ ← $-2\times\frac{1}{2}\sin 2\alpha + 2 = -\sin 2\alpha + 2$ — ۹

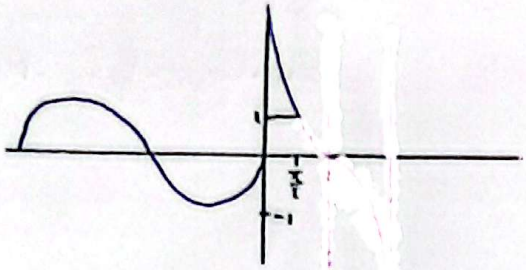
$T = \frac{2\pi}{1} = 2\pi$ ✓



$2\cos\left(2\pi + \frac{\pi}{2}\right) + 1$

$-2\sin(2\pi) + 1 \longrightarrow T = \frac{2\pi}{2\pi} = 1$ ✓





$R = [-1, -\infty)$ ✓ — ۷

$a + b\sin(cx)\cos(cx)\cos(2cx) \longrightarrow a + \frac{b}{4}\sin(4cx)$

$\frac{1}{2}\sin(2cx)\cos(2cx) = \frac{1}{4}\sin(4cx)$ ✓ — ۸

$T = \frac{\pi}{10} \longleftrightarrow \frac{2\pi}{10}$ ($T = \frac{2\pi}{10}$)

$\frac{1}{4c} = \frac{4\pi}{1}$ ✓ $\Rightarrow 4c = 1 \longrightarrow c = 1/4$

$b = 1$ ✓ $\quad a = +2$ ✓

$\frac{-1\times 1}{2} = 0$ ✓

$a\cos bx + c =$

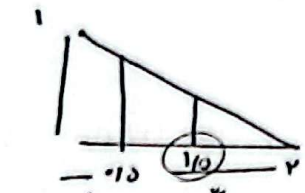
$T = \pi \longrightarrow \frac{2\pi}{b} = \pi \longrightarrow b = 2$ ✓ $\quad a = 3$ ✓ $\quad c = -1$ ✓

$3\cos 2x + 1 = y \qquad 3\cos 2x - 1 = 0 \longrightarrow \cos 2x = \frac{1}{3}$ ✓ , $\sin 2x = \frac{2\sqrt{2}}{3}$ ✓ — ۹

$|\tan 2x| = \left|\frac{\sin 2x}{\cos 2x}\right| = \left|\frac{\frac{2\sqrt{2}}{3}}{\frac{1}{3}}\right| = |2\sqrt{2}| = 2\sqrt{2}$ ✓

$f(-2\pi, 0) = f(-2\pi - 1 - 0.1) = f(1.1)$ ✓

— ۱۰



$f(1.12)$ ✓