task / 1834897

1) $y(x)=\frac{1}{\sin^2(2x-\frac{\pi}{3})}$ $\quad F(\frac{\pi}{3})=\frac{5}{6}\sqrt{3}$

$$F(x)=\int\frac{dx}{\sin^2(2x-\frac{\pi}{3})}=\frac{1}{2}\int\frac{2dx}{\sin^2(2x-\frac{\pi}{3})}=\frac{1}{2}\int\frac{d(2x-\frac{\pi}{3})}{\sin^2(2x-\frac{\pi}{3})}=$$

$$=-\frac{1}{2}\operatorname{ctg}(2x-\frac{\pi}{3})+C$$

$$F(\tfrac{\pi}{3})=-\frac{1}{2}\operatorname{ctg}(\tfrac{2\pi}{3}-\tfrac{\pi}{3})+C=\frac{5}{6}\sqrt{3}\Rightarrow-\frac{1}{2}\operatorname{ctg}\frac{\pi}{3}+C=\frac{5\sqrt{3}}{6}$$

$$\Rightarrow C-\frac{1}{2}\cdot\frac{1}{\sqrt{3}}=\frac{5\sqrt{3}}{6}\Rightarrow C=\frac{5\sqrt{3}}{6}+\frac{1}{2\sqrt{3}}\Rightarrow C=\frac{5\cdot3+3}{6\sqrt{3}}=\frac{6}{2\sqrt{3}}=\frac{3}{\sqrt{3}}=\sqrt{3}$$

$F(x)=-\frac{1}{2}\operatorname{ctg}(2x-\frac{\pi}{3})+\sqrt{3}$ (A)

2) $-5\cos4x=2\cos^2x+1$

$-5(2\cos^2 2x-1)=\cos2x+1+1$

$-10\cos^2 2x+5=\cos2x+2$

$10\cos^2 2x+\cos2x-3=0$

(B) $\cos2x=\frac{-1\pm\sqrt{1+120}}{20}=\frac{-1\pm\sqrt{121}}{20}=\frac{-1\pm11}{20}$

$\cos2x_1=\frac{1}{2}\quad 2x_1=\pm\frac{\pi}{3}+2\pi k\quad \boxed{x_1=\pm\frac{\pi}{6}+\pi k}\quad k\in Z$

$\cos2x_2=-\frac{12}{20}=-\frac{3}{5}\quad 2x_2=\pi\pm\arccos\frac{3}{5}+2\pi n$

$\boxed{x_2=\pm\arccos(-\frac{3}{5})/2+\pi k}\quad x_2=\frac{\pi}{2}\pm\frac{\arccos\frac{3}{5}}{2}+\pi n\quad n\in Z$

3) $\cos^2x-0,5\sin x>1$

$1-\cos^2x+0,5\sin x<0\qquad \sin^2x+0,5\sin x<0$

$\sin x(\sin x+0,5)<0$

$-0,5<\sin x<0$

(A)