106 - Cont.

d) $\left(0 \le x \le \frac{\pi}{2}\right)$

$$\frac{1+tg^2x}{tgx(1-tg^2x)} = 8\cos^2 x$$

$$\frac{\sec^2 x}{\frac{\sin x}{\cos x}\left(1-\frac{\sin^2x}{\cos^2x}\right)} = 8\cos^2 x$$

$$\frac{\frac{1}{\cancel{\cos^2 x}}}{\frac{\sin x}{\cos x}\frac{(\cos^2x-\sin^2x)}{\cancel{\cos^2x}}} = 8\cos^2 x$$

$$\frac{\cos x}{\sin x(\cos^2x-\sin^2x)} = 8\cos^2 x$$

$$\cos x\left(\frac{1}{\sin x(\cos^2x-\sin^2x)} - 8\cos x\right) = 0$$

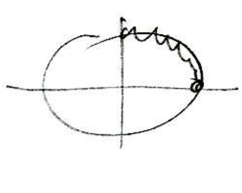
$0 \le x \le \frac{\pi}{2}$

$\Rightarrow$ $\cos x = 0$

or

$$\frac{1}{\sin x(\cos^2x-\sin^2x)} - 8\cos x = 0$$

So $\cos x = 0 \Rightarrow x = \pi/2$



$$\frac{1}{\sin x(\cos^2x-\sin^2x)} - 8\cos x = 0$$

$$\frac{1}{\sin x\cos 2x} - 8\cos x = 0$$

$$\frac{1}{\sin x\cos 2x} = 8\cos x$$

$$\frac{1}{\cos 2x} = 8\cos x\sin x$$

$$\frac{1}{\cos 2x} = 4\sin 2x$$

$$1 = 4\sin 2x\cos 2x$$

$$1 = 2\sin 4x$$

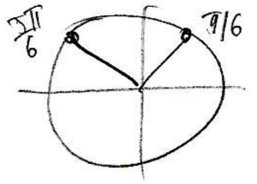
$\sin 4x = \frac{1}{2} \Rightarrow$

$0 \le x \le \frac{\pi}{2}$

$\therefore$ $0 \le 4x \le 2\pi$

$4x = \frac{\pi}{6}, \frac{5\pi}{6}$

$x = \frac{\pi}{24}, \frac{5\pi}{24}$



$\therefore$

$$\boxed{x = \frac{\pi}{24}, \frac{5\pi}{24}}$$

$$\boxed{x = \frac{\pi}{2}}$$