

3.86  
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$$\cos 7x + \cos x = 2\cos 3x (\sin 2x - 1)$$

$$2\cos 4x \cos 3x - 2\cos 3x (\sin 2x - 1) = 0$$

$$2\cos 3x (\cos 4x - \sin 2x + 1) = 0$$

↙

$$3x = \frac{\pi}{2} + \pi k$$

$$\boxed{x = \frac{\pi}{6} + \frac{\pi}{3}k}$$

↓

$$1 - 2\sin^2 2x - \sin 2x + 1 = 0$$

$$2\sin^2 2x + \sin 2x - 2 = 0$$

$$\sin 2x = \frac{-1 \pm \sqrt{1+8}}{2} = \frac{-1 \pm \sqrt{9}}{2}$$

$$\sin 2x = \frac{-1 - \sqrt{9}}{2}$$

∅

$$\sin 2x = \frac{\sqrt{9} - 1}{2}$$

$$\boxed{x = \frac{1}{2} \arcsin\left(\frac{\sqrt{9}-1}{2}\right) + \pi k}$$

$$\boxed{x = \pi - \frac{1}{2} \arcsin\left(\frac{\sqrt{9}-1}{2}\right) + \pi k}$$