

2.26  
2

$$\cos^2 2x + 3\cos^2 4x = \cos^2 6x$$

$$3\cos^2 4x = \cos^2 6x - \cos^2 2x$$

$$3\cos^2 4x = (\cos 6x - \cos 2x)(\cos 6x + \cos 2x)$$

$$3\cos^2 4x = -2\sin 4x \sin 2x \cdot 2\cos 4x \cos 2x \rightarrow \cos 4x (3\cos 4x + 2\sin 4x \sin 2x) = 0$$

$$4x = \frac{\pi}{2} + \pi k$$

$$\boxed{x = \frac{\pi}{8} + \frac{\pi k}{4}}$$

$$3\cos^2 4x + 2\sin^2 4x = 0$$

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

$$2\cos^2 4x - 3\cos 4x + 2 = 0$$

$$\cos 4x = \frac{3 \pm \sqrt{33}}{4}$$

$$\cos 4x = 2 \rightarrow \emptyset$$

$$\cos 4x = -\frac{1}{2} \rightarrow \boxed{x = \frac{\pi}{6} + \frac{\pi k}{2}}$$