

2.55
KS

$$\cos x + \cos 2x + \cos 3x = \sin 3x + \sin 4x + \sin 5x$$

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

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

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

$$\downarrow$$
$$\cos 2x - 2\cos 2x \sin 2x = 0$$

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

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

$$\downarrow$$
$$\sin 2x = \frac{1}{2}$$

$$2x = \frac{\pi}{6} + 2\pi k$$

$$2x = \frac{5\pi}{6} + 2\pi k$$

$$\rightarrow \boxed{x = \frac{\pi}{12} + \pi k}$$
$$\rightarrow \boxed{x = \frac{5\pi}{12} + \pi k}$$

$$\rightarrow \cos x = -\frac{1}{2}$$
$$\boxed{x = \pm \frac{2\pi}{3} + 2\pi k}$$