

$$2\cos 13x + 3\cos 3x + 3\cos 5x - 8\cos x \cdot \cos^3(4x) = 0$$

$$2\cos 13x + 3\left(\frac{2\cos(3x+5x)}{2} \cdot \frac{\cos(3x-5x)}{2}\right) - 8\cos x \cdot \cos^3(4x) = 0$$

$$2\cos 13x + 3 \cdot 2\cos(4x) \cdot \cos(x) - 8\cos x \cdot \cos^3(4x) = 0$$

$$2\cos 13x + 2\cos x \cdot \cos 4x (3 - 4\cos^2(4x)) = 0$$

$$2\cos 13x + 2\cos x \cdot (3\cos 4x - 4\cos^3(4x)) = 0$$

$$2\cos 13x - 2\cos x \cdot (\cos(12x)) = 0$$

$$2\cos 13x - \cos(x+12x) - \cos(x-12x) = 0$$

$$2\cos 13x - \cos(13x) - \cos(11x) = 0$$

$$\cos(13x) - \cos(11x) = 0$$

$$2\sin(12x) \cdot \sin(x) = 0$$

$$\sin x = 0$$

$$x = \pi k$$

$$2\sin 12x = 0$$

$$12x = \pi k$$

$$x = \pi k / 12$$

Ответ  $\pi k / 12$

$$\cos(3x) = 4\cos^3 x - 3\cos x$$

$$-\cos(3x) = 3\cos x - 4\cos^3 x$$