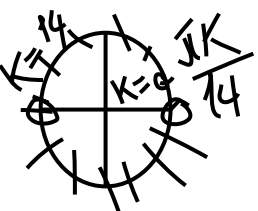


$$\begin{aligned} \cos x \cdot \cos 2x \cdot \cos 4x \cdot \cos 8x &= \frac{1}{8} \cos 15x \quad | \cdot 8 \sin x \\ \sin 2x &= 2 \sin x \cdot \cos x \\ 8 \sin x \cdot \cos x \cdot \cos 2x \cdot \cos 4x \cdot \cos 8x &= \cos 15x \cdot \sin x \\ 4 \sin 2x \cdot \cos 2x \cdot \cos 4x \cdot \cos 8x &= \cos 15x \cdot \sin x \\ 2 \sin 4x \cdot \cos 4x \cdot \cos 8x &= \cos 15x \cdot \sin x \\ \sin 8x \cdot \cos 8x &= \cos 15x \cdot \sin x \\ \sin 16x &= 2 \cos 15x \cdot \sin x \\ \sin 16x &= \sin(16x) - \sin(14x) \\ \sin 14x &= 0 \\ 14x &= \pi k \\ x &= \pi k / 14 \quad \text{при } k \in \mathbb{Z} \end{aligned}$$

пусть  
 $\sin x = 0$   
 $\cos x = \pm 1$   
 $\cos 2x = 2 \cos^2 x - 1 = 2 - 1 = 1$   
 $\cos 4x = 2 \cos^2 2x - 1 = 2 - 1 = 1$   
 $\cos 8x = 1$   
 $\cos 15x = \cos(16x - x) = \cos 16x \cdot \cos x + \sin 16x \cdot \sin x = 1 + 0 = 1$  или  $-1$   
 $\pm 1 \neq \pm \frac{1}{8}$   
 Значит предположение неверно



$$\begin{aligned} \cos(3y/2) + \sin(5y/2) &= 0 \\ \cos(2y - y/2) + \sin(2y + y/2) &= 0 \\ \cos 2y \cdot \cos y/2 + \sin y/2 \cdot \sin 2y + \sin 2y \cdot \cos y/2 + \sin y/2 \cdot \cos 2y &= 0 \\ \cos 2y(\cos y/2 + \sin y/2) + \sin 2y(\cos y/2 + \sin y/2) &= 0 \\ (\cos 2y + \sin 2y)(\cos y/2 + \sin y/2) &= 0 \\ \cos 2y + \sin 2y &= 0 \\ \sqrt{2}(\frac{1}{\sqrt{2}} \cos 2y + \frac{1}{\sqrt{2}} \sin 2y) &= 0 \\ \frac{1}{\sqrt{2}} &= \sin t \\ \frac{1}{\sqrt{2}} &= \cos t \\ \sqrt{2}(\sin t \cdot \cos 2y + \cos t \cdot \sin 2y) &= 0 \\ \sqrt{2}(\sin(t + 2y)) &= 0 \\ \sin(\pi/4 + 2y) &= 0 \\ \pi/4 + 2y &= \pi k \\ 2y &= \pi k - \pi/4 \\ y &= \pi k/2 - \pi/8 \end{aligned}$$

$$\begin{aligned} (\cos y/2 + \sin y/2) &= 0 \\ \sin(\pi/4 + y/2) &= 0 \\ \pi/4 + y/2 &= \pi k \\ y &= 2\pi k + \pi/2 \end{aligned}$$

$$\begin{aligned} \sin y + \cos 3y &= 1 - 2 \sin^2 y + \sin 2y \\ \sin y + \cos 3y - 1 + 2 \sin^2 y - \sin 2y &= 0 \\ 2 \cos(3y/2) \sin(-y)/2 + \cos 3y - \cos 2y &= 0 \\ 2 \cos(3y/2) \sin(-y)/2 + 2 \sin(5y/2) \sin(-y/2) &= 0 \\ (2 \cos(3y/2) + 2 \sin(5y/2)) \cdot (2 \sin(-y/2)) &= 0 \\ 2 \sin(-y/2) &= 0 \\ -2 \sin y/2 &= 0 \\ \sin y/2 &= 0 \\ y/2 &= \pi k \\ y &= 2\pi k \end{aligned}$$

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$$\begin{aligned} \cos(3y/2) + \sin(5y/2) &= 0 \\ \sin(\pi/2 - 3y/2) + \sin(5y/2) &= 0 \\ 2 \sin(\pi/2 - 3y/2 + 5y/2)/2 \cdot \cos(\pi/2 - 3y/2 - 5y/2)/2 &= 0 \\ 2 \sin(\pi/2 + 2y/2)/2 \cdot \cos(\pi/2 - 8y/2)/2 &= 0 \\ 2 \sin(\pi/2 + 2y/2)/2 &= 0 \\ \sin((\pi/2 + 2y/2)/2) &= 0 \\ (\pi/2 + 2y/2)/2 &= \pi k \\ 2y/4 &= \pi/4 - \pi k \\ y &= \pi/2 - 2\pi k \end{aligned}$$

$$\begin{aligned} \cos((\pi/2 - 8y/2)/2) &= 0 \\ (\pi/2 - 8y/2)/2 &= \pi/2 + \pi k \\ 8y/4 &= \pi/4 - \pi/2 - \pi k \\ y &= \pi/8 - \pi/4 - \pi k/2 \\ y &= -\pi/8 - \pi k/2 \\ \text{Ответ: } \pi/2 - 2\pi k; -\pi/8 - \pi k/2; 2\pi k \end{aligned}$$

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$$\begin{aligned} \sin a + \cos b \\ \sin(\pi/2 - a) = \cos a = \sin \pi/2 \cdot \cos a - \cos \pi/2 \cdot \sin a &= 1 \cdot \cos a - 0 \\ \cos(\pi/2 - b) = \sin b = \cos \pi/2 \cdot \cos b + \sin \pi/2 \cdot \sin b &= 0 + 1 \cdot \sin b \end{aligned}$$


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