

$$f(x) = \overset{①}{\cos(144\pi - x)} + \overset{②}{2\cos(1443\pi + x)} - \overset{③}{\sin(x + 2023\pi)}$$

$$+ \overset{④}{\cos(x)} - \frac{\sqrt{3}}{2}$$

$$\cos(k \times 2\pi + x) = \cos x$$

$$\begin{aligned} ① \quad \cos(144\pi - x) &= \cos(72 \times 2\pi - x) \\ &= \cos(-x) \quad \text{anw. falls} \\ &= \cos x \end{aligned}$$

$$\begin{aligned} ② \quad 2\cos(1443\pi + x) &= 2\cos(1442\pi + \pi + x) \\ &= 2\cos(721 \times 2\pi + \pi + x) \\ &= 2\cos(\pi + x) \\ &= -2\cos x \end{aligned}$$

$$\cos(\pi + x) = -\cos x$$

2. Teil

$$\begin{aligned} ③ \quad \sin(x + 2023\pi) &= \sin(2022\pi + \pi + x) \\ &= \sin(1011 \times 2\pi + \pi + x) \\ &= \sin(\pi + x) \\ &= -\sin x \end{aligned}$$

$$\sin(\pi + x) = -\sin x$$

2. Teil

$$④ \quad \cos x = \cos x$$

$$\begin{aligned} f(x) &= \cos x - 2\cos x - (-\sin x) + \cos x - \frac{\sqrt{3}}{2} \\ &= \cancel{\cos x} - \cancel{2\cos x} + \sin x - \frac{\sqrt{3}}{2} \\ &= \sin x - \frac{\sqrt{3}}{2} \end{aligned}$$