

$$(1) \cos(2x) = \cos(x+\pi) \Leftrightarrow 2x = \pm(x+\pi) \text{ modulo } 2\pi$$

$$1^{\text{er}} \text{ cas: } 2x = x+\pi + 2k\pi \text{ ou } k \in \mathbb{Z}$$

$$\Leftrightarrow x = \pi + 2k\pi \quad S_1 = \{ \dots, -\pi, \pi, 3\pi, 5\pi, \dots \}$$

$$| S_1 = \{ \pi + 2k\pi / k \in \mathbb{Z} \} |$$

$$2^{\text{e}} \text{ cas: } 2x = -(x+\pi) + 2k'\pi \Leftrightarrow 2x = -x - \pi + 2k'\pi$$

$$\Leftrightarrow 3x = -\pi + 2k'\pi \Leftrightarrow x = -\frac{\pi}{3} + \frac{2k'\pi}{3} \quad | S_2 = \{ -\frac{\pi}{3} + \frac{2k'\pi}{3} / k' \in \mathbb{Z} \} |$$

$$S_2 = \{ \dots, -\pi; -\frac{\pi}{3}; \frac{\pi}{3}; \frac{3\pi}{3} = \pi; \frac{5\pi}{3}; \dots \}$$

$k' = -1 \quad k' = 0 \quad k' = 1 \quad k' = 2 \quad k' = 3$

Finalment: $S = S_1 \cup S_2 = S_2$, car S_2 contient S_1 .

$$(2) \sin(2x) = \sin(3x) \Leftrightarrow \cos(\frac{\pi}{2} - 2x) = \cos(\frac{\pi}{2} - 3x)$$

$$\Leftrightarrow \frac{\pi}{2} - 2x = \pm(\frac{\pi}{2} - 3x) \text{ modulo } 2\pi$$

$$1^{\text{er}} \text{ cas: } \frac{\pi}{2} - 2x = \frac{\pi}{2} - 3x + 2k\pi$$

$$x = 2k\pi \quad (S_1 = \{ 2k\pi \text{ ou } k \in \mathbb{Z} \})$$

$$2^{\text{e}} \text{ cas: } \frac{\pi}{2} - 2x = -(\frac{\pi}{2} - 3x) + 2k'\pi \Leftrightarrow 5x = -\pi + 2k'\pi \Leftrightarrow x = -\frac{\pi}{5} + \frac{2k'\pi}{5}$$

$$S_2 = \{ -\frac{\pi}{5} + \frac{2k'\pi}{5} \text{ ou } k' \in \mathbb{Z} \} (=)$$

$$\dots, -\frac{\pi}{5}; \frac{\pi}{5}; \frac{3\pi}{5}; \pi; \frac{7\pi}{5}; \frac{9\pi}{5}; \frac{11\pi}{5}; \dots$$

$k' = 1 \quad k' = 0 \quad k' = 1 \quad k' = 2$

finalment: $S = S_1 \cup S_2$

$$S = \{ 2k\pi / k \in \mathbb{Z} \} \cup \{ -\frac{\pi}{5} + \frac{2k'\pi}{5} / k' \in \mathbb{Z} \}$$