

問題

問題 1. $0 \leq \theta < 2\pi$ のとき、次の不等式を解け。

$$(1) \sin\left(\theta - \frac{\pi}{4}\right) > \frac{\sqrt{3}}{2}$$

$$(2) \cos\left(\theta + \frac{\pi}{6}\right) < -\frac{1}{2}$$

$$(3) \cos\left(\theta + \frac{\pi}{3}\right) \geq \frac{\sqrt{3}}{2}$$

$$(4) \sin\left(\theta + \frac{2}{3}\pi\right) \leq \frac{1}{\sqrt{2}}$$

$$(5) \sin\left(\theta - \frac{\pi}{4}\right) < -\frac{1}{2}$$

$$(6) \cos\left(\theta - \frac{\pi}{4}\right) \leq \frac{\sqrt{3}}{2}$$

問題 2. $0 \leq \theta < 2\pi$ のとき、次の関数の最大値と最小値を求めよ。また、そのときの θ の値を求めよ。

$$(1) y = -\cos^2 \theta - \sin \theta + 2$$

$$(2) y = \sin^2 \theta + \sqrt{3} \cos \theta - 1$$

問題 3. $0 \leq \theta < 2\pi$ のとき、次の方程式を解け。

$$(1) 2 \sin^2 \theta - \sin \theta - 1 = 0$$

$$(2) 2 \cos^2 \theta + 3 \cos \theta - 2 = 0$$

$$(3) 2 \sin^2 \theta + 3 \cos \theta = 0$$

$$(4) 2 \cos^2 \theta - \sin \theta - 1 = 0$$

練習

練習 1. $0 \leq \theta < 2\pi$ のとき、次の不等式を解け。

$$(1) \sin\left(\theta + \frac{\pi}{6}\right) > \frac{1}{\sqrt{2}}$$

$$(2) \cos\left(\theta - \frac{\pi}{4}\right) < \frac{1}{2}$$

$$(3) \cos\left(\theta + \frac{\pi}{4}\right) \leq \frac{\sqrt{3}}{2}$$

$$(4) \sin\left(\theta + \frac{\pi}{3}\right) \geq \frac{1}{2}$$

$$(5) \sin\left(\theta - \frac{\pi}{3}\right) \geq -\frac{1}{\sqrt{2}}$$

$$(6) \cos\left(\theta - \frac{2}{3}\pi\right) < \frac{1}{2}$$

練習 2. $0 \leq \theta < 2\pi$ のとき、次の関数の最大値と最小値を求めよ。また、そのときの θ の値を求めよ。

$$(1) y = -\sin^2 \theta + 2 \cos \theta - 1$$

$$(2) y = \cos^2 \theta - \sqrt{2} \sin \theta - 1$$

練習 3. $0 \leq \theta < 2\pi$ のとき、次の方程式を解け。

$$(1) 2 \cos^2 \theta + 3 \cos \theta + 1 = 0$$

$$(2) \sin^2 \theta + 3 \sin \theta + 2 = 0$$

$$(3) 2 \cos^2 \theta - 3 \sin \theta = 0$$

$$(4) 2 \sin^2 \theta + 3 \cos \theta - 3 = 0$$

解答

問題 1.

$$(1) \frac{7}{12}\pi < \theta < \frac{11}{12}\pi \quad (2) \frac{\pi}{2} < \theta < \frac{7}{6}\pi \quad (3) \frac{3}{2}\pi \leq \theta \leq \frac{11}{6}\pi$$

$$(4) \frac{\pi}{12}\pi \leq \theta \leq \frac{19}{12}\pi \quad (5) 0 \leq \theta < \frac{\pi}{12}, \frac{19}{12}\pi < \theta < 2\pi \quad (6) 0 \leq \theta \leq \frac{\pi}{12}, \frac{5}{12}\pi \leq \theta < 2\pi$$

問題 2.

$$(1) \theta = \frac{3}{2}\pi \text{ で最大値 } 3, \theta = \frac{\pi}{6}, \frac{5}{6}\pi \text{ で最小値 } \frac{3}{4}$$

$$(2) \theta = \frac{\pi}{6}, \frac{11}{6}\pi \text{ で最大値 } \frac{3}{4}, \theta = \pi \text{ で最小値 } -1 - \sqrt{3}$$

問題 3.

$$(1) \theta = \frac{\pi}{2}, \frac{7}{6}\pi, \frac{11}{6}\pi \quad (2) \theta = \frac{\pi}{3}, \frac{5}{3}\pi \quad (3) \theta = \frac{2}{3}\pi, \frac{4}{3}\pi \quad (4) \theta = \frac{\pi}{6}, \frac{5}{6}\pi, \frac{3}{2}\pi$$

練習 1.

$$(1) \frac{\pi}{12} < \theta < \frac{7}{12}\pi \quad (2) \frac{7}{12}\pi < \theta < \frac{23}{12}\pi \quad (3) 0 \leq \theta \leq \frac{19}{12}\pi, \frac{23}{12}\pi \leq \theta < 2\pi$$

$$(4) 0 \leq \theta \leq \frac{\pi}{2}, \frac{11}{6}\pi \leq \theta < 2\pi \quad (5) \frac{\pi}{12} \leq \theta \leq \frac{19}{12}\pi \quad (6) 0 \leq \theta < \frac{\pi}{3}, \pi < \theta < 2\pi$$

練習 2.

$$(1) \theta = 0 \text{ で最大値 } 1, \theta = \pi \text{ で最小値 } -3$$

$$(2) \theta = \frac{5}{4}\pi, \frac{7}{4}\pi \text{ で最大値 } \frac{1}{2}, \theta = \frac{\pi}{2} \text{ で最小値 } -1 - \sqrt{2}$$

練習 3.

$$(1) \theta = \frac{2}{3}\pi, \pi, \frac{4}{3}\pi \quad (2) \theta = \frac{3}{2}\pi \quad (3) \theta = \frac{\pi}{6}, \frac{5}{6}\pi \quad (4) \theta = 0, \frac{\pi}{3}, \frac{5}{3}\pi$$