

問題

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

(1) $\sin \theta \geq \frac{1}{2}$

(2) $\cos \theta < \frac{1}{2}$

(3) $\cos \theta > -\frac{\sqrt{3}}{2}$

(4) $\sin \theta \leq \frac{1}{\sqrt{2}}$

(5) $\tan \theta > \sqrt{3}$

(6) $\tan \theta \leq -\frac{1}{\sqrt{3}}$

(7) $\tan \theta \leq 1$

(8) $\tan \theta > -\sqrt{3}$

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

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

練習

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

$$(1) \sin \theta \leq -\frac{\sqrt{3}}{2}$$

$$(2) \cos \theta < -\frac{1}{2}$$

$$(3) \cos \theta > \frac{1}{\sqrt{2}}$$

$$(4) \sin \theta \geq -\frac{1}{\sqrt{2}}$$

$$(5) \tan \theta \leq -1$$

$$(6) \tan \theta > \frac{1}{\sqrt{3}}$$

$$(7) \tan \theta < \sqrt{3}$$

$$(8) \tan \theta \geq -\frac{1}{\sqrt{3}}$$

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。

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

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

解答

問題 1.

$$(1) \frac{\pi}{6} \leq \theta \leq \frac{5}{6}\pi \quad (2) \frac{\pi}{3} < \theta < \frac{5}{3}\pi \quad (3) 0 \leq \theta < \frac{5}{6}\pi, \frac{7}{6}\pi < \theta < 2\pi$$

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

$$(7) 0 \leq \theta \leq \frac{\pi}{4}, \frac{\pi}{2} < \theta \leq \frac{5}{4}\pi, \frac{3}{2}\pi < \theta < 2\pi \quad (8) 0 \leq \theta < \frac{\pi}{2}, \frac{2}{3}\pi < \theta < \frac{3}{2}\pi, \frac{5}{3}\pi < \theta < 2\pi$$

問題 2.

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

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

練習 1.

$$(1) \frac{4}{3}\pi \leq \theta \leq \frac{5}{3}\pi \quad (2) \frac{2}{3}\pi < \theta < \frac{4}{3}\pi \quad (3) 0 \leq \theta < \frac{\pi}{4}, \frac{7}{4}\pi < \theta < 2\pi$$

$$(4) 0 \leq \theta \leq \frac{5}{4}\pi, \frac{7}{4}\pi \leq \theta < 2\pi \quad (5) \frac{\pi}{2} < \theta \leq \frac{3}{4}\pi, \frac{3}{2}\pi < \theta \leq \frac{7}{4}\pi \quad (6) \frac{\pi}{6} < \theta < \frac{\pi}{2}, \frac{7}{6}\pi < \theta < \frac{3}{2}\pi$$

$$(7) 0 \leq \theta < \frac{\pi}{3}, \frac{\pi}{2} < \theta < \frac{4}{3}\pi, \frac{3}{2}\pi < \theta < 2\pi \quad (8) 0 \leq \theta < \frac{\pi}{2}, \frac{5}{6}\pi \leq \theta < \frac{3}{2}\pi, \frac{11}{6}\pi \leq \theta < 2\pi$$

練習 2.

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

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