

9 小問集合. $0 \leq \theta < 2\pi$ とする. 以下の問いに答えよ.

(1) $\sin \theta = \frac{1}{3}$ のとき, $\cos \theta, \tan \theta$ の値を求めよ.

(2) $\cos \theta = -\frac{1}{4}$ のとき, $\sin \theta, \tan \theta$ の値を求めよ.

(3) $\tan \theta = 2$ のとき, $\sin \theta, \cos \theta$ の値を求めよ.

(1)

$$\sin^2 \theta + \cos^2 \theta = 1$$

$$\frac{1}{9} + \cos^2 \theta = 1$$

$$\cos^2 \theta = \frac{8}{9}$$

$$\therefore \cos \theta = \pm \frac{2\sqrt{2}}{3}$$

$$\cos \theta = \frac{2\sqrt{2}}{3} \text{ とき}$$

$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

$$\tan \theta = \frac{1}{2\sqrt{2}}$$

$$\cos \theta = -\frac{2\sqrt{2}}{3} \text{ とき}$$

$$\tan \theta = -\frac{1}{2\sqrt{2}}$$

$$\therefore \cos \theta = \pm \frac{2\sqrt{2}}{3}, \tan \theta = \pm \frac{1}{2\sqrt{2}}$$

(複号同順)

(2)

$$\sin^2 \theta + \cos^2 \theta = 1$$

$$\sin^2 \theta + \frac{1}{16} = 1$$

$$\sin^2 \theta = \frac{15}{16}$$

$$\therefore \sin \theta = \pm \frac{\sqrt{15}}{4}$$

$$\sin \theta = \frac{\sqrt{15}}{4} \text{ とき}$$

$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

$$\tan \theta = -\sqrt{15}$$

$$\sin \theta = -\frac{\sqrt{15}}{4} \text{ とき}$$

同様にして

$$\tan \theta = \sqrt{15}$$

$$\therefore \sin \theta = \pm \frac{\sqrt{15}}{4}, \tan \theta = \mp \sqrt{15}$$

(複号同順)

(3)

$$1 + \tan^2 \theta = \frac{1}{\cos^2 \theta}$$

$$1 + 4 = \frac{1}{\cos^2 \theta}$$

$$\cos^2 \theta = \frac{1}{5}$$

$$\therefore \cos \theta = \pm \frac{1}{\sqrt{5}}$$

また

$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

$$\sin \theta = \tan \theta \times \cos \theta$$

$$\therefore \cos \theta = \frac{1}{\sqrt{5}} \text{ とき}$$

$$\sin \theta = \frac{2}{\sqrt{5}}$$

$$\cos \theta = -\frac{1}{\sqrt{5}} \text{ とき}$$

$$\sin \theta = -\frac{2}{\sqrt{5}}$$

相互関係の利用. 基本.