

問題

44 (1) $0^\circ \leq \theta \leq 180^\circ$ で $\tan \theta = -\frac{\sqrt{15}}{3}$ のとき, $\sin \theta, \cos \theta$ の値を求めよ。

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(2) $\sin \theta = \frac{4}{5}$ で θ が鋭角のとき, $\sin(90^\circ - \theta), \tan(90^\circ - \theta)$ の値を求めよ。

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(1)

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

$$1 + \left(-\frac{\sqrt{15}}{3}\right)^2 = \frac{1}{\cos^2 \theta}$$

$$1 + \frac{15}{9} = \frac{1}{\cos^2 \theta}$$

$$\frac{24}{9} = \frac{1}{\cos^2 \theta}$$

$$\frac{24}{9} \cos^2 \theta = 1$$

$$\cos^2 \theta = \frac{9}{24}$$

$0^\circ \leq \theta \leq 180^\circ$, $\tan \theta < 0 \Rightarrow \cos \theta < 0$.

$$\cos \theta = -\sqrt{\frac{9}{24}} = -\frac{3}{2\sqrt{6}} = -\frac{6\sqrt{6}}{24} = -\frac{\sqrt{6}}{4}$$

∴ $\sin \theta > 0$.

$$\sin \theta = \sqrt{1 - \left(-\frac{\sqrt{6}}{4}\right)^2}$$

$$= \sqrt{1 - \frac{6}{16}} = \sqrt{\frac{10}{16}} = \frac{\sqrt{10}}{4}$$

$$\therefore \sin \theta = \frac{\sqrt{10}}{4}, \cos \theta = -\frac{\sqrt{6}}{4}$$

(2) θ が鋭角 $\Rightarrow 0^\circ < \theta < 90^\circ$. $\cos \theta > 0$

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

$$= \sqrt{1 - \left(\frac{4}{5}\right)^2}$$

$$= \sqrt{1 - \frac{16}{25}} = \sqrt{\frac{9}{25}} = \frac{3}{5}$$

$$\sin(90^\circ - \theta) = \cos \theta = \frac{3}{5}$$

$$\tan(90^\circ - \theta) = \frac{\sin(90^\circ - \theta)}{\cos(90^\circ - \theta)}$$

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

$$= \frac{3}{5} \times \frac{5}{4} = \frac{3}{4}$$

$$\sin(90^\circ - \theta) = \frac{3}{5}, \tan(90^\circ - \theta) = \frac{3}{4}$$

評価の規準

発表 5点, 調べた事や公式等 2点, 自己評価 3点

発表を含めた総合評価 (松村が記入)

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