数学 II 計算力チェック

_____年_____組_____番　名前_____

1. 次の値を求めよ。
   (1) θ が第四象限の角で $\cos\theta = -\dfrac{1}{3}$ のとき $\sin\theta$ と $\tan\theta$ の値

   (2) $\pi < \theta < 2\pi$ で $\sin\theta = -\dfrac{2}{5}$ のとき $\cos\theta$ と $\tan\theta$ の値

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解答

(1) $\sin\theta = -\dfrac{2\sqrt{2}}{3}$ $\tan\theta = 2\sqrt{2}$

(2) $\left(\cos\theta,\ \tan\theta\right) = \left(\dfrac{\sqrt{21}}{5},\ \dfrac{2\sqrt{21}}{21}\right),\quad \left(-\dfrac{\sqrt{21}}{5},\ -\dfrac{2\sqrt{21}}{21}\right)$

解説

(1) θ が第四象限の角であるから、$\sin\theta < 0$

$\qquad \sin^2\theta + \left(\dfrac{1}{9}\right) = 1$　より、$\sin^2\theta = \dfrac{8}{9}$　から、$\sin\theta = -\dfrac{2\sqrt{2}}{3}$

$\qquad \tan\theta = \sin\theta \times \dfrac{1}{\cos\theta} = \left(-\dfrac{2\sqrt{2}}{3}\right) \times \left(-\dfrac{3}{1}\right) = 2\sqrt{2}$

(2) $\pi < \theta < 2\pi$ であるから、$\cos\theta > 0$ と $\cos\theta < 0$ の両方が成立する。

$\qquad \left(\dfrac{4}{25}\right) + \cos^2\theta = 1$　より、$\cos^2\theta = \dfrac{21}{25}$　から、$\cos\theta = \pm\dfrac{\sqrt{21}}{5}$

$\qquad \cos\theta = \dfrac{\sqrt{21}}{5}$ のとき、$\tan\theta = \sin\theta \times \dfrac{1}{\cos\theta} = \left(\dfrac{2}{5}\right) \times \left(\dfrac{5}{\sqrt{21}}\right) = \dfrac{2}{\sqrt{21}} = \dfrac{2\sqrt{21}}{21}$

$\qquad \cos\theta = -\dfrac{\sqrt{21}}{5}$ のとき、$\tan\theta = \sin\theta \times \dfrac{1}{\cos\theta} = \left(\dfrac{2}{5}\right) \times \left(-\dfrac{5}{\sqrt{21}}\right) = -\dfrac{2}{\sqrt{21}} = -\dfrac{2\sqrt{21}}{21}$