

2013年第6問

 数理
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$$\boxed{6} \quad \cos \theta = \frac{\sqrt{5}}{5} \quad (0 < \theta < \frac{\pi}{2}) \text{ のとき,}$$

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

の値を求めよ。

$$\cos \theta = \frac{\sqrt{5}}{5} \text{ より } \sin^2 \theta = 1 - \frac{1}{5} = \frac{4}{5} \quad (0 < \theta < \frac{\pi}{2} \text{ より}) \quad \sin \theta = \frac{2\sqrt{5}}{5}$$

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

$$= \frac{-1}{3} + \frac{\frac{3}{5}}{1 + \frac{4}{5}} + \frac{\frac{4}{5}}{\frac{2}{5}}$$

$$= -\frac{1}{3} + \frac{1}{3} + 2$$

$$= \underline{\underline{2}}$$