

31. 三角比の相互関係

(1) 1 (2) 0 (3) 2 (4) 0 (5) 2 (6) -1

次の式の値を求めよ。

$$(1) \sin^2 40^\circ + \sin^2 50^\circ = \sin^2 40^\circ + \cos^2 40^\circ \\ = 1$$

$$(2) \tan 35^\circ \tan 55^\circ - \tan 15^\circ \tan 75^\circ = \tan 35^\circ \cdot \frac{1}{\tan 35^\circ} - \tan 15^\circ \cdot \frac{1}{\tan 15^\circ} \\ = 1 - 1 \\ = 0$$

$$(3) (\sin \theta + \cos \theta)^2 + (\sin \theta - \cos \theta)^2 = \sin^2 \theta + 2 \sin \theta \cos \theta + \cos^2 \theta + \sin^2 \theta - 2 \sin \theta \cos \theta + \cos^2 \theta \\ = 2(\sin^2 \theta + \cos^2 \theta) \\ = 2$$

$$(4) (1 - \sin \theta)(1 + \sin \theta) - \frac{1}{1 + \tan^2 \theta} = 1 - \sin^2 \theta - \frac{1}{\frac{1}{\cos^2 \theta}} \\ = \cos^2 \theta - \cos^2 \theta \\ = 0$$

$$(5) \sin^2 35^\circ + \cos^2 65^\circ + \sin^2 125^\circ + \cos^2 155^\circ = \cos^2 55^\circ + \sin^2 25^\circ + \sin^2 55^\circ + \cos^2 25^\circ \\ = 1 + 1 \\ = 2$$

$$(6) \frac{1}{\sin 57^\circ \cos 147^\circ} - \frac{1}{\tan 57^\circ \tan 123^\circ} = \frac{1}{\cos 33^\circ (-\cos 33^\circ)} - \frac{1}{\tan 33^\circ \cdot \left(-\frac{1}{\tan 33^\circ}\right)} \\ = -\frac{1}{\cos^2 33^\circ} + \tan^2 33^\circ \\ = -(1 + \tan^2 33^\circ) + \tan^2 33^\circ \\ = -1$$