



次の極限を求めよ。

(1) $\lim_{\theta \rightarrow 0} \frac{\tan 2\theta}{3\theta}$

(3) $\lim_{\theta \rightarrow 0} \frac{\theta \cos \theta}{\sin 3\theta}$

(5) $\lim_{\theta \rightarrow 0} \frac{\tan \theta}{\sin 2\theta}$

(2) $\lim_{\theta \rightarrow 0} \frac{\theta^2}{\sin 2\theta}$

(4) $\lim_{\theta \rightarrow 0} \frac{\theta + \sin \theta}{\tan \theta}$

(6) $\lim_{\theta \rightarrow 0} \frac{\theta^2 - \tan \theta}{\sin \theta}$

$(\lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta} = \frac{\tan \theta}{\theta} = 1)$

(1) $\lim_{\theta \rightarrow 0} \frac{\tan 2\theta}{2\theta} \cdot \frac{2\theta}{3\theta} = \frac{2}{3}$

(2) $\lim_{\theta \rightarrow 0} \frac{2\theta}{\sin 2\theta} \cdot \frac{\theta^2}{2\theta} = 1 \cdot 0 = 0$

(3) $\lim_{\theta \rightarrow 0} \frac{3\theta}{\sin 3\theta} \cdot \frac{\cos \theta}{3} = 1 \cdot \frac{1}{3} = \frac{1}{3}$

(4) $\lim_{\theta \rightarrow 0} \left(\frac{\theta}{\tan \theta} + \frac{\sin \theta}{\tan \theta} \right) = \lim_{\theta \rightarrow 0} \left(\frac{\theta}{\tan \theta} + \cos \theta \right) = 1 + 1 = 2$

(5) $\lim_{\theta \rightarrow 0} \frac{\tan \theta}{\theta} \cdot \frac{2\theta}{\sin 2\theta} \cdot \frac{1}{2} = \frac{1}{2}$

(6) $\lim_{\theta \rightarrow 0} \left(\frac{\theta}{\sin \theta} \cdot \theta - \frac{\tan \theta}{\sin \theta} \right) = \lim_{\theta \rightarrow 0} \left(\frac{\theta}{\sin \theta} \cdot \theta - \frac{\tan \theta}{\theta} \cdot \frac{\theta}{\sin \theta} \right)$

$= 0 - 1$

$= -1$