

4 次の問に答えよ.

$$(1) \quad \lim_{n \rightarrow \infty} \frac{1}{n} \left\{ \sum_{k=n+1}^{2n} \log k - n \log n \right\} = \int_1^2 \log x dx \text{ を示せ.}$$

$$(2) \quad \lim_{n \rightarrow \infty} \left(\frac{(2n)!}{n!n^n} \right)^{\frac{1}{n}} \text{ を求めよ.}$$