

第6章の補遺2 もう一つの微分積分の基本定理

問題 6.補遺2.1

$$F'(x) = \frac{d}{dx} \int_1^x \ln t dt = \ln x .$$

問題 6.補遺2.2

$$f'(x) = \frac{d}{dx} \int_{\pi}^x \cos t^2 = \cos x^2 .$$

問題 6.補遺2.3

$y = \ln x$ とおく.

$$\begin{aligned} f'(x) &= \frac{d}{dx} \int_0^{\ln x} te^t dt = \frac{d}{dx} \int_0^y te^t dt = \frac{d}{dy} \int_0^y te^t dt \cdot \frac{dy}{dx} = ye^y \frac{d}{dx} \ln x = \ln x \cdot e^{\ln x} \cdot \frac{1}{x} = \ln x \cdot x \cdot \frac{1}{x} \\ &= \ln x . \end{aligned}$$