

(1) [3] Determine the derivative of  $h(x) = \int_2^{1/x^2} \arctan(t) dt$ .

(2) [6] Evaluate the definite integral  $\int_e^{e^4} \frac{1}{x\sqrt{\ln(x)}} dx$

(3) [6] Determine  $\int x \cosh(x) dx$ .