

A useful inequality for

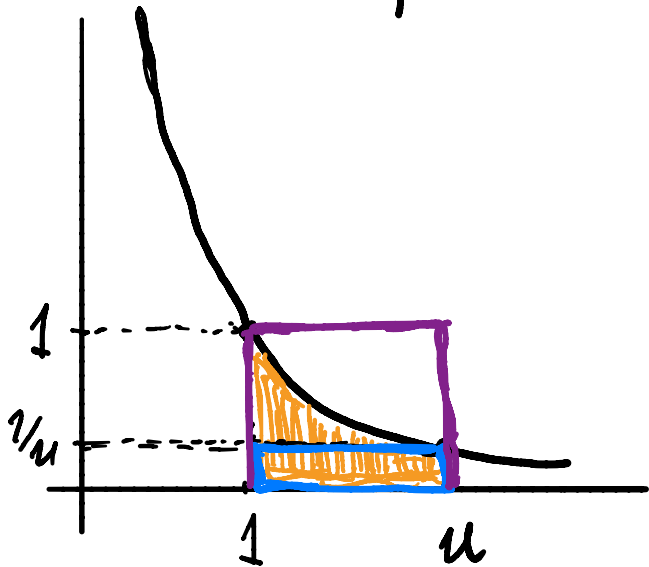
$$\ln \left(1 + \frac{1}{x}\right)^x \quad \text{for } x > 0$$

Exercise 1.3.5

From calculus we know that for $u > 0$

$$\ln(u) = \int_1^u \frac{1}{t} dt.$$

$\ln(u) =$ orange area
Clearly



calculate
function
of u



$\ln(u)$



calculate
function of u

I hope this helps!

- ① apply to $u = 1 + \frac{1}{x}$
- ② deduce an inequality for $\ln\left(1 + \frac{1}{x}\right)^x$