

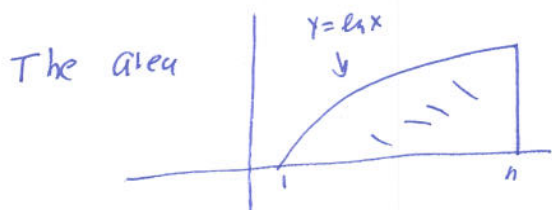
PRINT Your Name: _____

Quiz - March 14, 2006

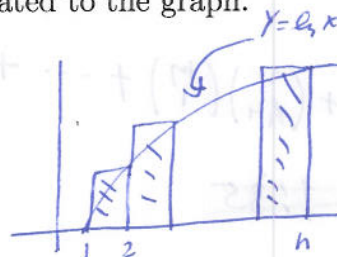
Explain, very thoroughly, why

$$\int_1^n \ln x \, dx < \ln n! < \int_1^{n+1} \ln x \, dx.$$

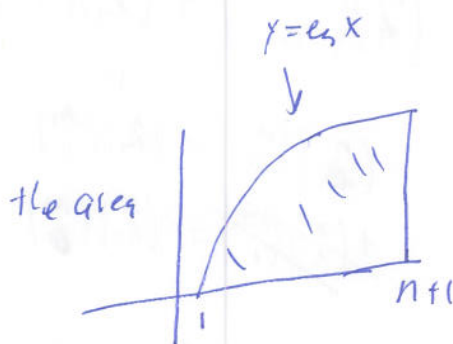
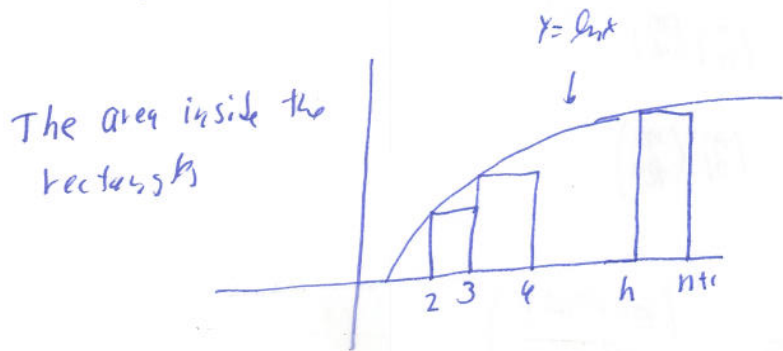
You might want to draw a graph and some rectangles related to the graph.



the area inside the rectangles



So $\int_1^n \ln x \, dx \leq \ln 2 + \ln 3 + \dots + \ln n = \ln n!$



So $\ln n! = \ln 2 + \dots + \ln n < \int_1^{n+1} \ln x \, dx$