

### 3 points extra credit

This is due friday at the exam. Do not talk to others or use any outside sources besides your book, notes, and brain. For credit, your solution must be entirely correct.

- a. (1 point) Check that the following is true for any integer  $N \geq 1$

$$\ln(N + 1) \leq \sum_{n=1}^N \frac{1}{n} \leq \ln(N) + 1$$

- b. (2 points) Now, verify that the series

$$\sum_{n=1}^{\infty} \frac{1}{1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \dots + \frac{1}{n}} = \sum_{n=1}^{\infty} \frac{1}{\sum_{k=1}^n \frac{1}{k}}$$

diverges.