09.02

Homework

A.2-4. $\sum_{k=1}^{n} k^3$

A.2-3. $\sum_{k=1}^{n} \frac{1}{k}$

$= \sum_{k=1}^{\frac{n}{2}} \frac{1}{k} + \sum_{k=\frac{n}{2}+1}^{n} \frac{1}{k}$

$\geq \sum_{k=1}^{\frac{n}{2}} 0 + \sum_{k=\frac{n}{2}+1}^{n} \frac{1}{k}$

split into $\lg n$ pieces.

$\geq \sum_{k=\frac{n}{2}+1}^{n} \frac{1}{k}$

$\geq \sum_{k=\frac{n}{2}+1}^{n} \frac{n}{2}+1$ ~~$\geq \sum_{k=\frac{n}{2}+1}^{n} \frac{1}{\frac{n}{2}+1}$~~

$= (\frac{n}{2}+1) \sum_{k=\frac{n}{2}+1}^{n} 1$

$= (\frac{n}{2}+1)(\frac{n}{2})$

$= \frac{n^2}{4} + \frac{n}{2}$

B.1-1. $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$