

1. 4 Please circle True or False, as appropriate.

(a) T / **F** : If $0 < a_n < b_n$ and $\sum b_n$ converges, then $\sum a_n$ converges.

(b) **T** / F : If $0 < a_n < b_n$ and $\sum b_n$ diverges, then $\sum a_n$ diverges.

(c) **T** / F : If $0 < b_n < a_n$ and $\sum b_n$ converges, then $\sum a_n$ converges.

(d) T / **F** : If $0 < b_n < a_n$ and $\sum b_n$ diverges, then $\sum a_n$ diverges.

2. 6 Use the Comparison Test to show the following series converges or diverges.

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

Since $0 \leq \frac{(\ln n)^2}{n^2 + 1} \leq \frac{(n^{1/4})^2}{n^2 + 1} \leq \frac{n^{1/2}}{n^2 + 1} \leq \frac{1}{n^{3/2}}$ for large n

$\sum_{n=1}^{\infty} \frac{1}{n^{3/2}}$ is a convergent p -series ($p = 3/2 > 1$),

by comparison $\sum_{n=1}^{\infty} \frac{(\ln n)^2}{n^2 + 1}$ also converges.