

Given $\sum \frac{1}{n(\log n)^p} ; p > 0$

by Cauchy condensation test

$$\sum 2^n \cdot \frac{1}{f(2^n)} = \sum_{n=2}^{\infty} \frac{2^n}{2^n (\log 2^n)^p}$$

$$= \sum_{n=2}^{\infty} \frac{2^n}{2^n (n \log 2)^p}$$

$$= \sum_{n=2}^{\infty} \frac{1}{n^p (\log 2)^p}$$

$$= \frac{1}{(\log 2)^p} \sum_{n=2}^{\infty} \frac{1}{n^p}$$

Now this series is convergent if $p > 1$

& Divergent if $p \leq 1$