

SOLUTION 9.5 # 23

MATH 153 SP01

Try Integral test here ... it works quite ok (if you remember the fact that “n” beats “ln”, that is, $\lim_{n \rightarrow \infty} \frac{\ln(n)}{n} = 0$)

$$\begin{aligned} \int \frac{\ln(x)}{x^2} dx &= \\ &= \int \frac{1}{x} \ln(x) \frac{1}{x} dx \end{aligned}$$

take $y = \ln(x) \Rightarrow x = e^y$ and $dy = \frac{1}{x} dx$ and get

$$\int \frac{1}{e^y} \cdot y dy = \int y e^{-y} dy$$

and now go for integration by parts etc - it's a good exercise to remember how to integrate :)

I'll leave the pleasure of computing this to you. In any case, you get it's convergent.