SOLUTION 9.5 # 24

MATH 153 SP01

Here actually it's more fun :) because we use again integral test, but there's no need to compute the integral ... you'll see why.

Again, go for

$$\int \frac{1}{\ln(x)^2}\,dx$$

and take $y = \ln(x) \Rightarrow x = e^y \Rightarrow dx = e^y\,dy$ so you get

$$\int \frac{1}{y^2} e^y\,dy$$

and we integrate from 1, let's say, to ∞. But what happens inside the integral? $\frac{e^y}{y^2} \to \infty$, since exponential "beats" poynomials! so the integral has no chance of being finite! (you see ... it's similar to what happens to series). Hence the integral is infinite, so by integral test (of course, you checked to see that $\frac{1}{\ln(n)^2}$ decreases, right?) the series is DIVERGENT!

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