

$$\begin{aligned} \int_1^\infty 9 \frac{\ln x}{x} dx &= \lim_{t \rightarrow \infty} \left[ 9 \frac{(\ln x)^2}{2} \right]_1^t \quad \left[ \begin{array}{l} \text{by substitution with} \\ u = \ln x, du = dx/x \end{array} \right] \\ &= 9 \lim_{t \rightarrow \infty} \frac{(\ln t)^2}{2} = \infty. \quad \text{Divergent} \end{aligned}$$