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

$$= 9\lim_{t\to\infty}\frac{(\ln t)^2}{2} = \infty. \qquad \text{Divergent}$$