

50. If $p = 1$, $\int_0^1 \frac{1}{x} dx = \lim_{a \rightarrow 0^+} [\ln x]_a^1 = \lim_{a \rightarrow 0^+} -\ln a = \infty$.

Diverges. For $p \neq 1$,

$$\int_0^1 \frac{1}{x^p} dx = \lim_{a \rightarrow 0^+} \left[\frac{x^{1-p}}{1-p} \right]_a^1 = \lim_{a \rightarrow 0^+} \left(\frac{1}{1-p} - \frac{a^{1-p}}{1-p} \right).$$

This converges to $\frac{1}{1-p}$ if $1-p > 0$ or $p < 1$.