

1. Suppose $f : \mathbb{R} \rightarrow \mathbb{R}$ and for some $a \in \mathbb{R}$ both $\int_a^\infty f$ and $\int_{-\infty}^a f$ exist.

Show for all $b \in \mathbb{R}$ both $\int_b^\infty f$ and $\int_{-\infty}^b f$ converge and:

$$\int_a^\infty f + \int_{-\infty}^a f = \int_b^\infty f + \int_{-\infty}^b f$$