Property: Cartesian Product is not Associative

When A, B, C such that each one has at least one element, we have that

$$(A \times B) \times C \cap A \times (B \times C) = \emptyset$$

Proof

- *An element from the left hand side would have the form $((\cdot, \cdot), \cdot)$ and the one on the right $(\cdot, (\cdot, \cdot))$, thus there is no element in both the right hand side and left hand side.*

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Remark

They are functionally the same if you were to ignore all inner tuples. Eg, when we talk about R^3 it doesn't matter if we are talking about $(R \times R) \times R$ or $R \times (R \times R)$ we are simply talking about the set of all triples involving elements from R