

Question 50

This exercise presents Russell's paradox. Let S be the set that contains a set x if the set x does not belong to itself, so that $S = \{x \mid x \notin x\}$.

Part a

Show the assumption that S is a member of S leads to a contradiction.

Assume $S \in S$.

By definition of S , this means $S \notin S$.

$S \in S$ implies $S \notin S$ is a contradiction.

Part b

Show the assumption that S is not a member of S leads to a contradiction.

Assume $S \notin S$.

By definition of S , this means $S \in S$.

$S \notin S$ implies $S \in S$ is a contradiction.