In the presented bachelor thesis we will focus on mathematical paradoxes, especially the Banach-Tarski paradox. We will show several paradoxes concerning decompositions of sets, such as the Sierpiński-Mazurkiewicz paradox. Next, we perform a constructive proof of the Banach-Tarski theorem in $\mathbb{R}^3$ using a special group of rotations. Finally, we generalize the notion of equidecomposability to continuous equidecomposability and prove that the Banach-Tarski pardox holds even under the stricter condition of continuous equidecomposability. This will answer de Groot's question.