I. Introduction

This report looks at the data from the Titanic disaster to see what factors helped people survive. The Titanic sank in 1912, and not everyone had the same chance of living. We believe that a person's chance of survival depended on things like their gender, money (class), and age.

II. How We Looked at the Data

We used a computer program to study the Titanic passenger list (`titanic.csv`). Here's what we did:

- **Cleaned the Data:** We had to fix some missing information. We filled in missing `Age` with the average age, missing `Embarked` ports with the most common one ('S'), and removed the `Cabin` column because it was mostly empty.
- **Analyzed and Visualized:** We calculated the real chances of survival for different groups (like men vs. women) and made charts to show the results clearly.
- **One Small Issue:** Filling in missing ages isn't perfect, but it gives us a good idea of the trends.

III. What We Found

Here are the key discoveries from the data:

- **Survival by Gender:** There was a huge difference. Women had a ~74% chance of survival, while men only had a ~19% chance.
- **Survival by Class:** Your ticket class made a big difference. First-class passengers had a ~63% survival rate, while third-class passengers only had a ~24% rate.
- **Survival by Age:** Children had a higher chance of survival than adults, which supports the "women and children first" idea.

IV. What It All Means

Our findings show that survival wasn't just about luck.

The "women and children first" rule seems to have been followed, which is why their survival rates were higher. Also, rich people in first class had rooms on the top decks, closer to the lifeboats. Poor people in third class were on the lower decks and had a harder time getting out.

This is where the idea of real vs. guessed probability is important. A simple guess (theoretical probability) would be a 50/50 chance of survival. But the data (empirical probability) shows the real chance was only about 38%, and this number was very different depending on who you were.

V. Conclusion

In the end, who you were mattered a lot on the Titanic. Your gender, wealth, and age were the most important factors that decided if you survived. The disaster showed that a person's social status had a big impact during a crisis.