

8-3-1 Titanic Data Revisited – One approach to answering the question

This problem is based on *Illustrative Mathematics Common Core State Standards Illustration S-CP The Titanic 3*.

Question: Who do you think was given priority in the lifeboats?

Data:

	Survived	Did not survive	Total
Children in first class	6	0	6
Women in first class	140	4	144
Men in first class	57	118	175
Children in second class	24	0	24
Women in second class	80	13	93
Men in second class	14	154	168
Children in third class	27	52	79
Women in third class	76	89	165
Men in third class	75	387	462
Total	498	818	1316

Extension: This table gives additional data on crew survival, which now allows us to address the entire ship population of 2,224.

	Survived	Did not survive	Total
Women in crew	20	3	23
Men in crew	192	693	885

Source: British Parliamentary Papers, Shipping Casualties (Loss of the Steamship "Titanic") 1912, cmd 6352
'Report of a Formal Investigation into the circumstances attending the foundering on the 15th April 1912, of the British Steamship "Titanic" of Liverpool, after striking ice in or near Latitude 41°46'N., Longitude 50°14'W., North Atlantic Ocean, whereby loss of life ensued.' (London: His Majesty's Stationery Office, 1912), page 42

As stated in the problem set solutions, this problem is intentionally open-ended and answers will vary. This file addresses one way to look at the problem and attempt to answer the question.

Note: these comments operate under the assumptions of the extension question, including the men and women of the crew in the calculations.

If we look solely at sex/age, we can see what percentage of each group was saved.

	Survived	Total	Percent Saved
Children	57	109	52.29
Women	316	425	74.35
Men	338	1690	20.00

Clearly, women and children survived at a much higher rate than men.

However, that doesn't mean that class did not play a role in one's survival. This chart gives us more data on that aspect of the rescue:

Actual survival rates by sex, age, and class compared to expected survival rates based on sex and age alone					
Passenger Category	Percent Saved	Expected Percent Saved	Number Saved	Expected Number Saved	Percent Deviation
Women, First Class	97.22	74.35	140	107.1	30.76
Children, First Class	100.00	52.29	6	3.1	91.23
Men, First Class	32.57	20.00	57	35.0	62.86
First Class total	62.46	44.68	203	145.2	39.80
Women, Second Class	86.02	74.35	80	69.1	15.69
Children, Second Class	100.00	52.29	24	12.6	91.23
Men, Second Class	8.33	20.00	14	33.6	-58.33
Second Class total	41.40	40.46	118	115.3	2.34
Women, Third Class	46.06	74.35	76	122.7	-38.05
Children, Third Class	34.18	52.29	27	41.3	-34.64
Men, Third Class	16.23	20.00	75	92.4	-18.83
Third Class total	25.21	36.32	178	256.4	-30.58
Women, Crew	86.96	74.35	20	17.1	16.95
Men, Crew	21.69	20.00	192	177.0	8.47
Crew total	23.35	21.38	212	194.1	9.22
Grand Total	31.97	31.97	711	711.0	0.00
Source: British Parliamentary Papers, Shipping Casualties (Loss of the Steamship "Titanic"), 1912, cmd. 6352, 'Report of a Formal Investigation into the circumstances attending the foundering on the 15th April, 1912, of the British Steamship "Titanic," of Liverpool, after striking ice in or near Latitude 41° 46' N., Longitude 50° 14' W., North Atlantic Ocean, whereby loss of life ensued.' (London: His Majesty's Stationery Office, 1912), page 42					

Source: *Titanic Disaster: Official Casualty Figures and Commentary*. Chuck Anesi, n.d. Web. 11 May 2013. <<http://www.anesi.com/titanic.htm>>.

- The first column of numbers shows the actual percentage saved for that category.
- The second column shows the expected percent saved, which is the percentage of that sex/age saved regardless of any other distinction.
 - For example, there were 425 women on board (including crew), 316 of which survived. $\frac{316}{425} \approx 0.7435$ or 74.35%, so if we ignore class, we would expect any given woman to survive 74.35% of the time.
- The third column gives the actual number saved in each category
- The fourth column gives the expected number saved by applying the expected percent saved to the number of people in that category.
 - For example: there were 144 women in first class. If we expect 74.35% of all women to survive, we would expect that about 107 of them would have survived ($144 \cdot 0.7435 \approx 107.06$)

- The fifth column gives the percent deviation, which is a measure of the difference between what actually happened and what would have happened if class were not a factor.
 - For example: 140 women in first class survived, but if all women were treated equally we would expect about 107 of them to survive. That means approximately 33 more women in first class survived than we expected. 33 is about 30% of 107, the expected number of survivors. So the number that were actually saved, 140, deviates by about 30% from how many would have been saved if class didn't matter.

A positive percentage deviation means that more people were saved than would be expected if class were not a factor. A negative percentage deviation means that fewer people were saved than would be expected if class were not a factor, and the magnitude of the percentage deviation shows us approximately how much a factor being in that class was on a given person's rate of survival.