

Problem Set 7.1

1.) Give an example of an event with: (and be prepared to share and discuss in the next class)

a) relative frequency = 1

Answers will vary
→ Picking 10 red skittles in a bowl of only red skittles
→ Flipping either heads or tails on a fair coin.

b) relative frequency = 0

Answers will vary
→ A Human will live forever
→ Everyone in FST fell asleep at the exact same time on 3/14/2020.

2.) The data below describes passenger survival from the Titanic. (note, the data excludes crew members). One of the reasons there were so many fatalities was that for aesthetic reasons the ship did not carry enough lifeboats for its capacity. There was only room for a maximum of 52.9% of the boat's population in the lifeboats, but the survival rate was much less than that.

Source: The Real Reason for the Tragedy of the Titanic. The Wall Street Journal, n.d. Web. 2 Mar. 2013.

This data is organized in a **two-way table** – a table that classifies data based on possible categories for two different variables at the same time, one by rows and one by columns. It also includes the totals for each category and an absolute total.

variable: passenger class

variable: passenger outcome

	Survived	Did not survive	Total
First class passengers	202	123	325
Second class passengers	118	167	285
Third class passengers	178	528	706
Total passengers	498	818	1316

absolute total

category totals

Handwritten notes: A red box highlights the 'Survived' column. A yellow box highlights the 'Total' column. A yellow circle highlights the 'Total passengers' row. A yellow circle highlights the '1316' value. Blue arrows point from labels to the corresponding parts of the table. A yellow oval encircles the entire table. To the right, a vertical double-headed arrow is labeled 'C' and a horizontal double-headed arrow is labeled 'R'.

Data Table Source: Common Core State Standards - Illustrations. Illustrative Mathematics, n.d. Web. 27 Feb. 2013. <<http://www.illustrativemathematics.org/illustrations/949>>.

a) What is the sum of the numbers in the red box? Why?

1316 – total # of passengers on the titantic

b) What does the number 498 in the bottom row represent?

total passengers that survived

c) What is the relationship between the four numbers in the last column?

All totals → first 3 rows is total passengers in each class and last one is total in all.

d) What's wrong with this question: "What is the probability that any passenger survived?"

The event happened in the past – so not probability

e) Does this table give relative frequencies? Explain.

No, but you could find relative frequencies from the table.

f) What was the relative frequency of survival?

$$\underline{498} / \underline{1316} = 0.378$$

want
total

g) What was the relative frequency of third-class passengers on the ship?

$$706 / 1316 = 0.534$$

h) What was the relative frequency of third-class survivors?

$$\underline{178} / \underline{1316} = 0.135 \quad \text{OR} \quad \underline{178} / \underline{706} = 0.252$$

i) If we only consider survivors, what was the relative frequency of third-class passengers?

$$178 / 498 = 0.357$$

j) Which is bigger between your answers for h and i? Why?

i is bigger b/c it is looking at a smaller portion of people so smaller denominator makes ratio bigger

k) Did class of passenger affect the likelihood of survival? Justify your answer with calculations, and if it did, provide a possible reason why that may have been the case.

$$202 / 325 = 0.622$$

$$118 / 285 = 0.414$$

$$178 / 706 = 0.357$$

You had a much higher chance of surviving in first class than in 3rd class.

l) Give one other example of other types of questions about relative frequency that can be answered with this table and answer your question. Show your work.

Answers will vary.
Ex. give relative frequency of passengers who did not survive the Titanic.

3) The table shows the relative frequencies of the ages of the students at Porter Gaud High School.

If a student is randomly selected from this school, find the probability that

a) the student is 15 years old

$$P(15) = 0.23$$

b) the student is 16 years of age or older

$$P(16 \text{ or older}) = 0.36$$

There are 1200 students at Porter Gaud High School.

c) Calculate the number of 15 year old students.

$$\underline{0.23} (\underline{1200}) = \underline{276 \text{ students}}$$

↑ total

Age (in years)	Relative Frequency
13	0.11
14	0.30
15	0.23
16	0.21
17	0.15
Total	1