**Main Problem #3**

Topic: *Reason with Fractions*

Problem: Your friend Aaron is a lawyer at an investment firm and he is responsible for looking at profit data and reasoning about whether or not the firm is doing well financially. While at work one day, he was printing some reports when his computer suddenly turned off. Aaron had to present his findings at a board meeting, but without his calculations, he could not back up his claims. He then decided to call you over to his office and discuss the data. The table below shows the company’s profits, in billions, for every quarter for the last 4 years, and the very last line reports the total profits for each year and their sum.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| YEAR/QUARTER | Q1 | Q2 | Q3 | Q4 | Total |
| 2014 | 4 | 7 | 2 | 1 | 14 |
| 2015 | 6 | 4 | 1 | 2 | 13 |
| 2016 | 3 | 5 | 1 | 7 | 16 |
| 2017 | 2 | 5 | 6 | 9 | 22 |
| TOTAL PROFIT: 2014-2016 | 65 |

Q1. For each year, order the quarters from least to greatest with respect to the fraction of the total profit made that year. Simplify fractions.

Q2. Order the years from least to greatest with respect to their fraction of the total sum.

Q3. If the company doing well financially? Justify your answer.

A1.

(2014) => Answer: Q4, Q3, Q1, Q2

Q1: $\frac{4}{14}=\frac{2}{7}$; Q2: $\frac{7}{14}$=$\frac{1}{2}$; Q3: $\frac{2}{14}=\frac{1}{7}$; Q4: $\frac{1}{14}$

(2015) => Answer: Q3, Q4, Q2, Q1

Q1: $\frac{6}{13}$; Q2: $\frac{4}{13}$; Q3: $\frac{1}{13}$; Q4: $\frac{2}{13}$

(2016) => Answer: Q3, Q1, Q2, Q4

Q1: $\frac{3}{16}$; Q2: $\frac{5}{16}$; Q3: $\frac{1}{16}$; Q4: $\frac{7}{16}$

(2017) => Answer: Q4, Q3, Q1, Q2

Q1: $\frac{2}{22}=\frac{1}{11}$; Q2: $\frac{5}{22}$; Q3: $\frac{6}{22}=\frac{3}{11}$; Q4: $\frac{9}{22}$

A2. Answer: 2015, 2014, 2016, 2017

2014: $\frac{14}{65}$; 2015: $\frac{13}{65}=\frac{1}{5}$; 2016: $\frac{16}{65}$; 2017: $\frac{22}{65}$

A3. Every year, except for 2013, the investment firm is earning more profit according to A2. Therefore, the company is doing well so far even though they earned less money one year. With success rate of $\frac{3}{4}$, that is, there were 3 years in which a given year earned more than the previous year, the company is somewhat doing okay.