MTH 23 LECTURE NOTES (Ojakian)

Topic 2: Frequency Tables and Histograms

OUTLINE

References (**Algebra Book**: pages 3,4,9; **Statistics Book**: ch. 2)

1. Frequency Tables
2. Histograms
3. Fractions, decimals, percents
4. Doing Relative Frequency
5. Doing it in Excel

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1. Review!
   (a) Simplifying Fractions
   (b) Arithmetic in general (and with fractions in particular).
   (c) Conversions between three forms of number: Fraction, Decimal, Percent
2. Basics of Frequencey Table
   (a) Required properites:
      i. Every piece of data in exactly one class
      ii. Each class is the same width
   (b) What to do if data is on a boundary?
      i. Who cares!
      ii. But state your convention and be consistent for all classes: Count data in larger class or smaller class?
   (c) And to avoid:
      i. First class starts too soon
      ii. Last class goes too far
   (d)

PROBLEM 1. *Make frequency table of one of the quantitative variables of our class data, starting with some fixed class width.*

PROBLEM 2. *Suppose we are considering data which include the following: 23, 5, 67, 40. What is wrong with taking the following as our classes for a frequency table:*

20 - 30, 30 - 40, 40 - 50?

PROBLEM 3. *Suppose we are considering data which include the following: 23, 5, 67, 40. What is wrong with taking the following as our classes for a frequency table:*

20 - 30, 30 - 45, 45 - 60, 60 - 70?

3. Basics of Histograms

Note: We will do simplified version of what the book does!

(a) Histogram is simply a drawing of the frequency table

(b) Make sure the axes are to scale (use zig-zag as needed ...)

PROBLEM 4. *Make a histogram from the frequency table in Problem 1.*

(c) What does the histogram tell us about our data?
Typical Questions:

i. Symmetrical, bimodal, skewed left (longer tail on left side), or skewed right (longer tail on right side)?

ii. Any outliers?

4. Details on How to Begin a Frequency Table

Either start with some **Class Width** or some **Number Of Classes**.

(a) If start you start with Class Width (what we did above, and less typical):

i. Start with smallest data.

ii. Make each class the desired width.

iii. Go till you include the largest data.

(b) If you start with the Number Of Classes.

i. Set Class Width $= \dfrac{\text{Max} - \text{Min}}{\text{Number of Classes}}$

ii. Keep the Class Width as a decimal or **increase** its size up to at most the next integer.

iii. Then proceed as before, starting with the smallest data ...

(c)

PROBLEM 5. *Make a frequencey table for our class data from Problem 1, but now make it so it has 4 classes. And make the corresponding histogram.*

5. Relative Frequency - Histograms meet Fractions ...

(a) Everything is the same! Except:

i. Count the total number of data, say N.

ii. Find the percent of total for each class (by divding the count in each class by N)

iii. Keep as a decimal or convert to percent

(b) To make Relative-Frequency Histogram: Just change y-axis labels on original histogram.

PROBLEM 6. *Convert the frequency table and histogram from Problem 5 into a relative-frequency histogram.*

PROBLEM 7. *What do the percentages from the classes add up to? Is this always the case?*

6. Do it in Excel

PROBLEM 8. *Do exercie 22 from section 2.1 (7th Ed) using Excel.*

(a) Sort data by selelecting then: `Home` → `(Sort and Filter)`

(b) Create class labels and enter the count for each class.

(c) Select your two columns

(d) `Insert` → `Picture of Bars` → `2-D Column`

7. Reading Histograms

PROBLEM 9. *From the book, section 2.1 (7th ed), do problem 7.*