MTH 23.5 LECTURE NOTES (Ojakian)

Topic 3: Frequency Tables/Histograms and Fraction, Decimals, Percents

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OUTLINE
References (**Algebra Book**: pages 3, 4; **Statistics Book**: 1.3, 2.1, 2.2)

1. Frequency Tables

2. Histograms

3. Fractions, decimals, percents

4. Doing Relative Frequency

5. Doing it in Excel

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1. <u>Basics of Frequencey Table</u>

   (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 to be consistent: Count data to be in the first class it appears.

   (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, using some number of classes.*

   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?

2. <u>Basics of Histograms</u>

   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?

3. <u>Details on How to Begin a Frequency Table</u>

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 the corresponding histogram from Problem 1.*

4. <u>Representating numbers: As fractions, decimals, or percents</u>

(a) The three ways: Fractions, Decimals, Percents
(b) Convert: Percent → Decimal (just divide by 100)
(c) Convert: Decimal → Percent (just multiple by 100)
(d) Convert: Fraction → Decimal (just divide)
(e) Convert: Decimal or Percent → Fraction ... Next Topic!
(f)

PROBLEM 6. *Look at our class stats and find the fractions of students in various categories. Convert the fraction to a decimal and to a percent.*

5. <u>Relative Frequency - Histograms meet Fractions ...</u>

   (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 7. *Convert the frequency table and histogram from Problem 5 into a relative-frequency histogram.*

   PROBLEM 8. *What do the percentages from the classes add up to? Is this always the case?*

6. <u>Reading Histograms</u>

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