MTH 23.5 LECTURE NOTES (Ojakian)

Topic 2: Excel, Arithmetic, and Measures of Central Tendency

OUTLINE

References (**Algebra Book**: None; **Statistics Book**: 2.5)

1. Data summaries: Mean, median, mode, range, etc.
2. Accompanying notation, terminology and use of Excel

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1. Preliminary Notation

PROBLEM 1. *Suppose we have the following two data sets:*

- $X:\ x_1 = 4,\ \ x_2 = 7,\ \ x_3 = -5,\ \ x_4 = 0,\ \ x_5 = -1$
- $Y:\ y_1 = 34.9,\ \ y_2 = -10,\ \ y_3 = -34.9,\ \ y_4 = 3,\ \ y_5 = 4,\ \ y_6 = 3$

Evaluate the following:

(a) $\sum x$

(b) $\sum y$

2. Measures of Central Tendency: Mean, Median, Mode

(a) Mode:

(b) Mean (or average):

(c) Median:

i. N odd: Middle number (i.e. number at position $\frac{N+1}{2}$)

ii. N even: Mean of two middle numbers (i.e. at positions $\frac{N}{2}$ and $\frac{N}{2}+1$).

(d) Remark: Sometimes "average" refers to "mean" and sometimes "average" refers to any of mean, median, or mode. If someone says "arithmetic average" they definitely mean the mean.

(e) EXERCISES

PROBLEM 2. *Consider the data: 1, 4, 0, -2, 1.*

i. What is the mean? What is the median?

ii. If the largest number is increased, how does this effect the mean and median?

iii. If the smallest number is decreased, how does this effect the mean and median?

PROBLEM 3. *The* ***net worth*** *of someone is the amount of money that person would have if they sold everything they have and then subtracted their debt. Based on the Net Worth handout, answer the following questions (round numbers to nearest 1000):*

i. Suppose there is bar with two typical 40 year olds and three typical 50 year olds. What is the mean net worth and what is the median net worth in the bar?

ii. Suppose there is bar with 99 typical 40 year olds. What is the mean net worth and what is the median net worth in the bar? Now pick your favorite super rich man from the top eight; suppose he walks into the bar. Now what is the mean net worth and what is the median net worth bar?

3. Using Excel Functions

(a) Some functions (remember = !!):

i. For summing use: `sum`

ii. For mean use: `average`

iii. For median use: `median`

iv. For mode use: `mode`

(b) Using different "worksheets".

(c) Please! ... Organize your work clearly.

(d) Exercises

PROBLEM 4. *Experiment with Excel to find THREE different data sets, with the requested property.*

i. Its mean is larger than its median

ii. Its median is larger than its mean

iii. Its median is equal to its mean

PROBLEM 5. *Go to* **Cengage Data** *(at webpage), download "Heights of Pro Basketball Players" from the* $n \geq 30$ *data. Find the median. Find the mean in two ways: 1) using the* `average` *function and 2) using the* `sum` *function, but not the* `average` *function.*

Webpage:

`https://college.cengage.com/mathematics/brase/understandable_statistics/7e/students/datasets/svls/frames/frame.html`