Math 2311

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Office Hours: MW 11am to 1pm in 639 PGH

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And by appointment

Class webpage: http://www.math.uh.edu/~bekki/Math2311.html

Math 2311
Class Notes for Section 1.1 & 1.2

Section 1.1:
Types of data:

- Population Data – everything / everyone we are studying

- Sample Data – subset of population

Example: Identify the population and the sample for each of the following:

1. University of Houston in interested in how many students buy used books as opposed to new ones. They randomly choose 100 students at the student center to interview.

population - all UH students

Sample - 100 chosen students.

2. An elementary school is creating a new lunch menu. They send questionnaires to students with last names that begin with the letters M through R.

population - everyone at elem.

Sample - students (M-R) that answer quest.

A **variable** is a characteristic of an individual that can assume more than one value. Variables can be classified as **categorical** (qualitative) or **quantitative** (numeric).

- Categorical variables – describes quality

- Quantitative variables – numeric measurements

Quantitative variables can be classified as either **discrete** or **continuous**.

- Discrete quantitative variables – countable

- Continuous quantitative variables – can take on a range of values on an interval

Example: Classify the following variables as categorical or quantitative. If quantitative, state whether the variable is discrete or continuous.

3. Political preference.

4. Number of siblings.

5. Blood type.

6. Height of men on a professional basketball team.

7. Time it takes to be on hold when calling the IRS at tax time.

Section 1.2:

One question we want to answer about data is about its location, particularly the location of its center.

- Mean – "average" add up values + divide by n

  Symbols for mean: $\bar{x}$ vs. μ

  $\bar{x}$ = sample mean n = number in sample

  μ = pop. mean N = number in population

- Median – "middle"

  put list in order (if two numbers in middle, average)

- Mode – most

Examples:

1. Twelve babies spoke for the first time at the following ages (in months):

8 9 10 11 12 13 15 15 18 20 20 26

1 2 3 4 5 6 7 8 9 10 11 12

a. What is the mean of the data?

```
> babies=c(8,9,10,11,12,13,15,15,18,20,20,26)
> mean(babies)
[1] 14.75
> median(babies)
[1] 14
```

b. What is the median of the data?

$$\frac{13+15}{2} = 14$$

2. Here are the weights (in pounds) of 20 steers on an experimental feed diet:

174 142 131 145 175 150 176 151 110 162

133 163 135 178 178 154 166 146 156 167

a. What is the mean of the data?

b. What is the median of the data?

c. What is the mode of the data?

```
>
steers=c(174,142,131,145,175,150,176,151,110,162,133,1
63,135,178,178,154,166,146,156,167)
> mean(steers)
[1] 154.6
> median(steers)
[1] 155
> mode(steers)
[1] "numeric"
> sort(steers)
 [1] 110 131 133 135 142 145 146 150 151 154 156 162
163
[14] 166 167 174 175 176 178 178
```

3. The test scores of a class of 20 students have a mean of 71.6 and the test scores of another class of 14 students have a mean of 78.4. Find the mean of the combined group.

$$\frac{20(71.6) + 14(78.4)}{34} = 74.4$$

$\times$

$20 + 14$

4. Explain why the conclusion drawn is not valid:

A businesswoman calculates that the median cost of the five business trips that she took in a month is $600 and concludes that the total cost must have been $3000.

mean instead of median

~~100~~ 150 200 600 2000 5000 ~~10000~~