

SECTION 1.2
STATISTICS, MATH 181
MR. KELTNER

SIMPLE RANDOM
SAMPLING





GENSUS

- ◆ If we choose to use data from the entire population, we have a *census*.
 - ◆ **Example:** U.S. Census every 10 years
 - ◆ **Benefit**
 - ◆ When the population is small and easily accessible, because it is very accurate.
 - ◆ **Downfall**
 - ◆ How do you account for homeless people?
 - ◆ What about people who do not respond?
 - ◆ Statistical estimates are supplied for the missing responses.



IT'S IN OUR HANDS

www.census.gov/2010census



SAMPLING AND **E**XPERIMENTATION

- ◆ When conducting a *census* becomes time-consuming, costly, impractical, or even impossible, then taking a *sample* of the population is a reasonable means of conducting an experiment.
- ◆ If *sampling* is appropriate, then we must choose a method of sampling that represents the entire population accurately.



REPRESENTATIVE SAMPLES

- ◆ Using the weights of professional football players to determine the average weight of all adult males would be unreasonable.
- ◆ This is ***not*** a representative sample.
- ◆ Using annual income data from students who attend St. Thomas Aquinas would not accurately reflect annual income for all Kansas citizens.
- ◆ This is ***not*** a representative sample.



P ***PROBABILITY*** ***SAMPLING***

- ◆ Most modern sampling procedures involve using ***probability sampling***, which uses some sort of device to decide which members of the population will make up the sample.
- ◆ This eliminates any human bias (influence) that might contribute to conducting a nonrepresentative sample.
- ◆ In this section and section 1.3, we examine some of the most important probability-sampling methods.



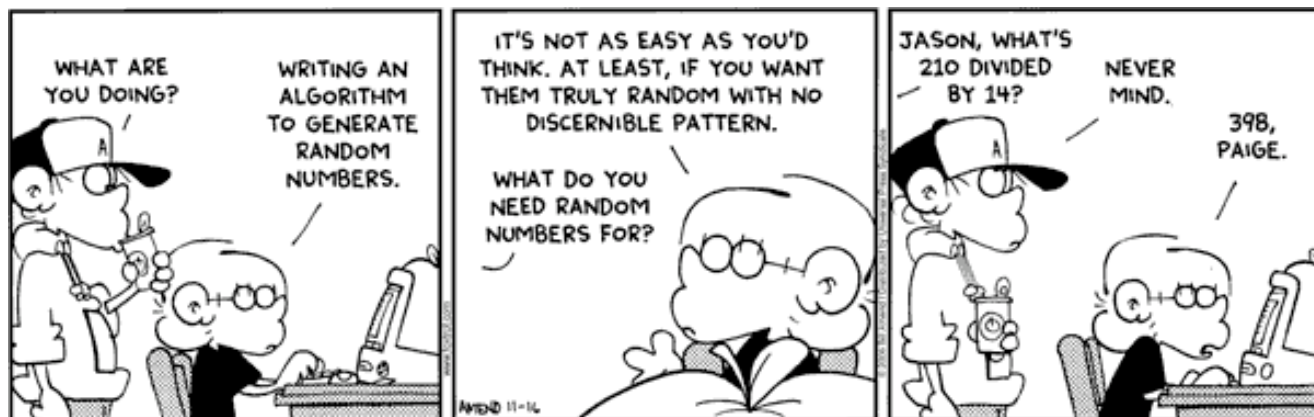
HOW DO WE PICK?

- ◆ “Random” sampling can have several factors tied to it that make the process much more deliberate than just “leaving to chance” what item is chosen.
- ◆ The way we will use is a random number generator.



SIMPLE RANDOM SAMPLING

- ◆ **Simple random sampling** is a sampling procedure where each possible sample of a given size is equally likely to be the one obtained.
 - ◆ This means each element of the population stands an equally likely chance of being chosen for the sample.
- ◆ A **simple random sample** is a sample obtained by simple random sampling.





SAMPLING WITH REPLACEMENT

- ◆ A sampling technique where each element may be selected from the sample, but it is **NOT removed** from the population.
 - ◆ It is put back in the population and could potentially be selected multiple times for our sample.
- ◆ **Examples**
 - ◆ Someone who takes the ACT four times and gets a 12 each time will affect the average score for their school.
 - ◆ Picking one sock in the dark, then picking and replacing another sock until you find a matching pair.



SAMPLING WITHOUT REPLACEMENT

- ◆ A sampling technique where each element may be selected from the sample, but it ***IS removed*** from the population.
 - ◆ If someone wins a grand prize at After Prom, their name is removed from consideration for the remaining grand prizes.
- ◆ Unless otherwise stated, the book assumes that simple random sampling is done without replacement.



RANDOM NUMBER **GENERATORS**

- ◆ There are ways to “pick” random numbers, but there is one built into our calculator
 - ◆ Press MATH
 - ◆ → to PRB
 - ◆ Choose 5:randInt(
 - ◆ Enter the lower and upper values you want to pick between
- ◆ For more than one random number (trial) at the same time:
 - ◆ (lower #, upper #, number of trials)

```
randInt(1,100)
95
```

```
randInt(1,100,5)
(91 15 52 41 74)
```

Pgs. 17-18:

#'s 1.30, .31, .40, .44(b only)

A ***SSESSMENT***



