STA 291
Spring 2007

Lecture 11 - *Wednesday, Feb 14*

- Exam I   Tomorrow, Feb. 15

   5 – 7 pm CB 106

- Review

- Bring a calculator

- Will provide a formula sheet

- No cell phone, notebook computer, …

- If you cannot take it from 5 – 7 pm, see me

- Computation of (sample) mean, median, etc.

- Computation of (sample) variance, standard deviation

Application of the Empirical Rule

- Data must have a bell shaped distribution
  - Mean =
  - Standard Deviation =
  - 68% of the data are supposed to be between _____ and _____

  - 95% of the data are supposed to be between _____ and _____

- Empirical rule is only approximate.

Probability: Basic Terminology

- **Outcome:** Any possible result of an experiment.

- **Sample Space:** The collection of all possible outcomes of an experiment.

- **Event:** A specific collection of outcomes.

- **Simple Event:** An event consisting of exactly one outcome.

Assigning Probabilities to Events

- The probability of an event is nothing more than a value between 0 and 1. In particular:

  --- 0 implies that the event will not occur

  --- 1 implies that the event will occur for sure

- Never have probability > 1, never < 0 .

- How do we go about figuring out probabilities?

Assigning Probabilities to Events

- There are different approaches to assigning probabilities to events

- **–** equally likely outcomes (classical approach)

- **–** relative frequency   (will cover after exam)
- -- Subjective   (will cover after exam)

Equally Likely Approach

- The equally likely outcomes approach usually relies on symmetry/geometry to assign probabilities to events.

- Suppose that an experiment has only n outcomes. The equally likely approach to probability assigns a probability of $1/n$ to each of the outcomes.

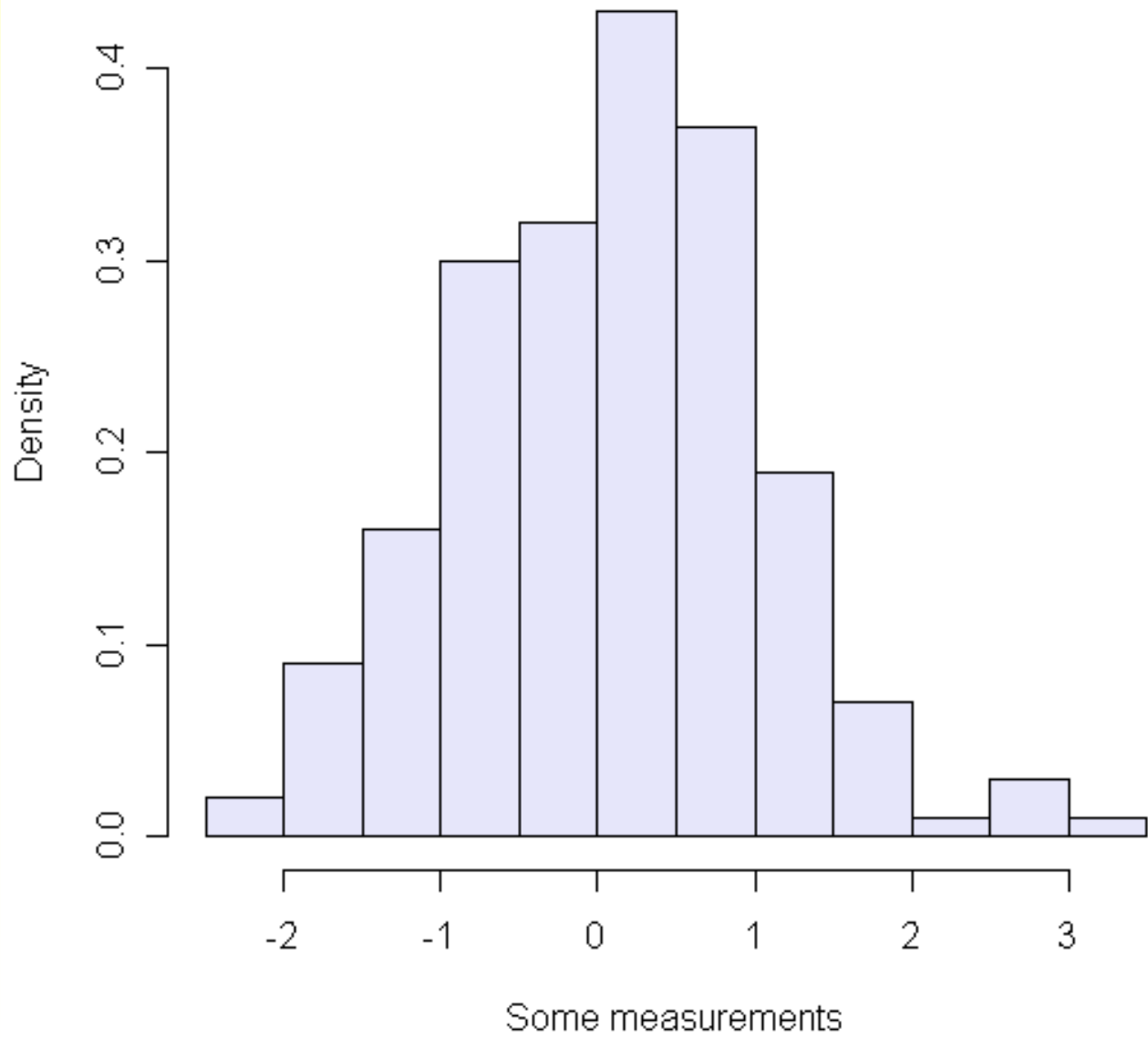- Further, if an event A is made up of m outcomes, then $P(A) = m/n$.

Equally Likely Approach

- Examples:

1. A deck of 52 cards (well shuffled).   Pick one. Let event A={ace},   P(A) =

2. Roll a fair die
   – The probability of the event "4 or above" is

- Flip a fair coin two times

- A = { exactly one H }

- P(A) =

- Lotto Kentucky Pick 3

- Last digit of your Social Security number
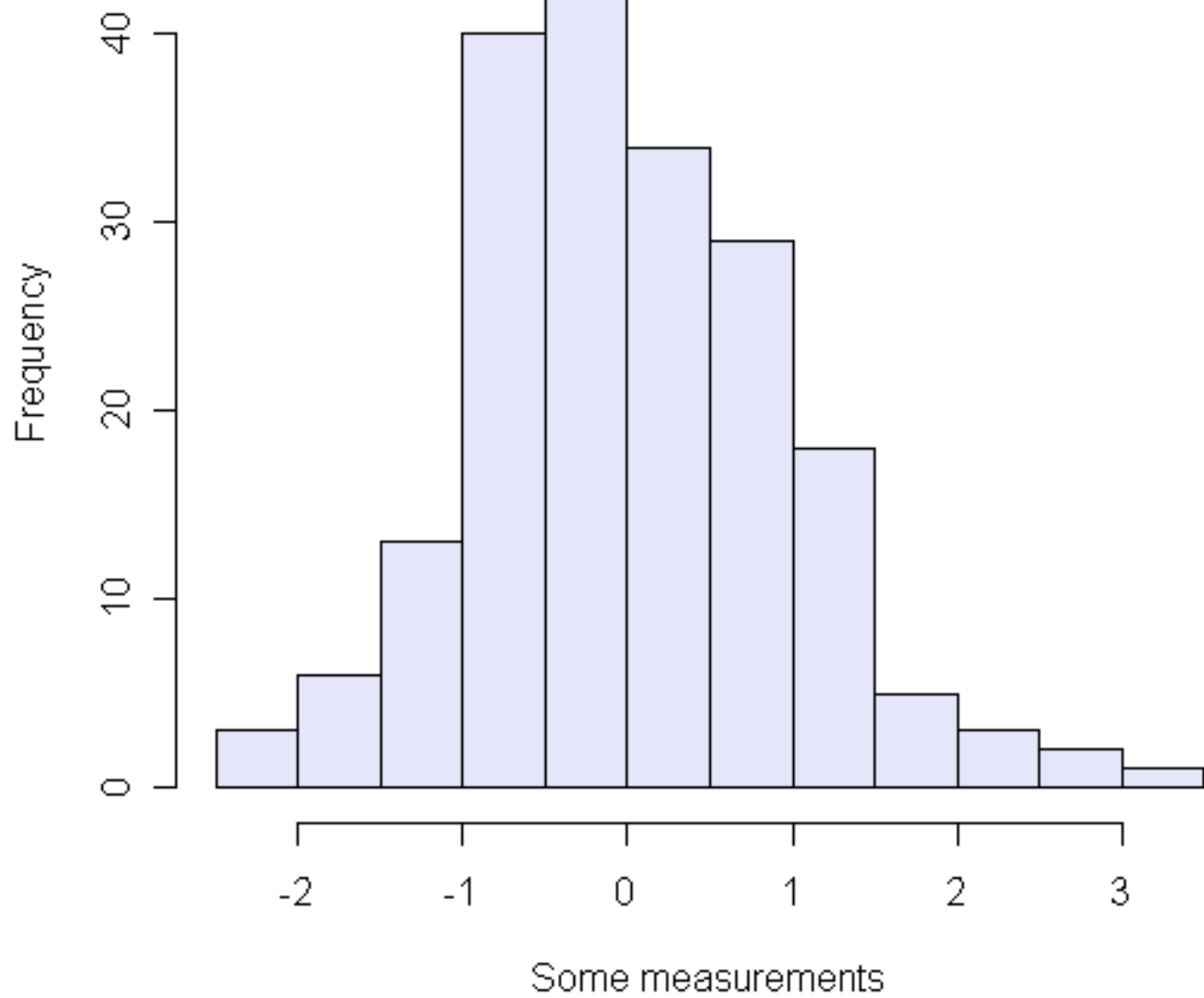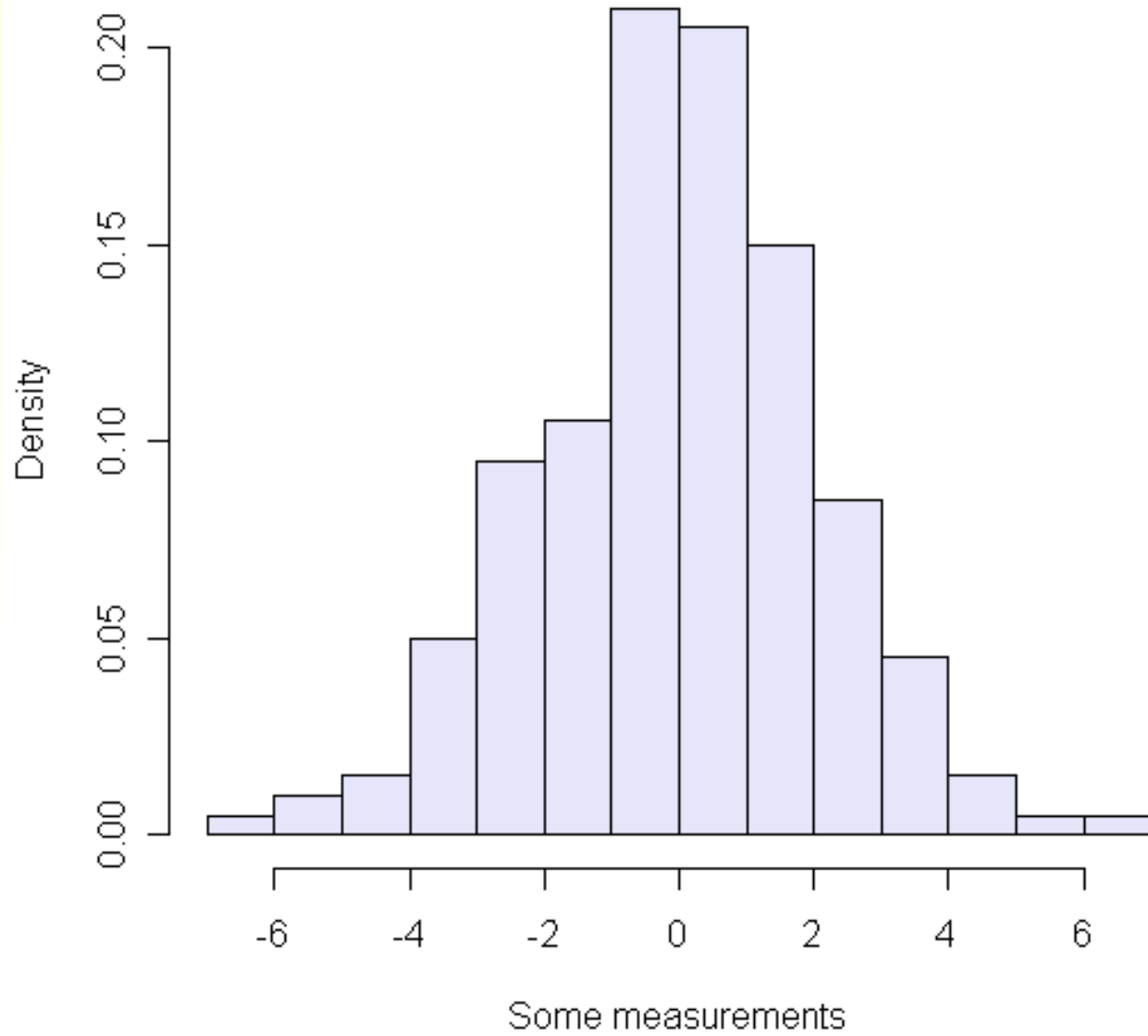
- There are about twice as much observations have values in between 0 and 0.5 as are between 1 and 1.5

Min   is approx. = - 2.5

Max   is approx. =   3.5

- There are about 5% (that is 0.05) of all observations fall between 3 and 4.

- According to the National Association of Home Builders, the U.S. nationwide median selling price of homes sold in 1995 was $118,000

- Would you expect the mean to be larger, smaller, or equal to $118,000?

- Which of the following is the most plausible value for the standard deviation:

(a) –15,000, (b) 1,000, (c) 45,000, (d) 1,000,000?

- Quartiles

- Q1   the median of the lower half of the observations

- Q3   the median of the upper half of the observations

Attendance Survey Question 11

- On a 4"x6" index card
  - Please write down your name and section number
  - Today's Question:

    What is the name of this plot?