

Exam 1 Review

Note: This is not a complete list of topics – you should study your lecture notes and homework in addition to reviewing the items listed here.

1. variable classification
 - a. qualitative vs. quantitative
 - b. discrete vs. continuous
2. terms:
 - a. population
 - b. sample
 - c. factors
 - d. response variable
 - e. treatment
 - f. class
 - g. lower/upper limits
 - h. observational study vs. designed experiment
3. types of sampling
 - a. (simple) random
 - b. systematic
 - c. stratified
 - d. cluster
 - e. convenience
 - f. multi-stage
4. obtaining a random sample
 - a. on TI-83: randInt(start, end, sample size)
 - b. make sure to check for repeats!
5. know how to construct:
 - a. frequency table
 - b. relative frequency table
 - c. bar graph
 - d. Pareto chart
 - e. pie chart
 - f. histogram
 - g. stem-and-leaf plot
 - h. frequency polygon
 - i. cumulative frequency table
 - j. cumulative relative frequency table
 - k. ogive
 - l. time series plot
6. parameter vs. statistic
7. measures of center
 - a. arithmetic mean
 - i. $\mu = \frac{\sum x_i}{N}$
 - ii. $\bar{x} = \frac{\sum x_i}{n}$
 - b. median
 - c. mode

Know when to use each statistic.

8. measures of dispersion

- a. range
- b. variance

$$\text{i. } \sigma^2 = \frac{\sum (x_i - \mu)^2}{N}$$

$$\text{ii. } s^2 = \frac{\sum (x_i - \bar{x})^2}{n-1}$$

- c. standard deviation
- d. The Empirical Rule

9. grouped data

- a. approximate mean

$$\text{i. } \mu \approx \frac{\sum x_i f_i}{\sum f_i}$$

$$\text{ii. } \bar{x} \approx \frac{\sum x_i f_i}{\sum f_i}$$

- b. weighted mean

$$\bar{x}_w = \frac{\sum w_i x_i}{\sum w_i}$$

- c. approximate variance

$$\text{i. } \sigma^2 \approx \frac{\sum (x_i - \mu)^2 f_i}{\sum f_i}$$

$$\text{ii. } s^2 \approx \frac{\sum (x_i - \bar{x})^2 f_i}{(\sum f_i) - 1}$$

10. measures of position

- a. z-score

$$z = \frac{x - \mu}{\sigma} \text{ or } z \approx \frac{x - \bar{x}}{s}. \text{ Know when to use } \sigma \text{ or } s.$$

- b. percentiles

- To find P_k , the index i is $i = \left(\frac{k}{100} \right) (n + 1)$.

1. If i is an integer, $P_k = x_i$.

2. If i is not an integer, P_k is the average of the values before and after i .

$$\text{(i.e. If } i = 5.75, P_k = \frac{x_5 + x_6}{2}.$$

- To find the percentile of x , use the formula:

$$\text{percentile} = \frac{\# \text{ of values less than } x}{n} \cdot 100.$$

- c. quartiles
- d. interquartile range
- e. lower fence
- f. upper fence

11. box plots: minimum, Q_1 , M , Q_3 , maximum, lower and upper fences, outliers