

## Test 1 Checklist

1. be able to use your calculator to work problems as in class/HW
2. data: qualitative vs quantitative, continuous vs discrete
3. random variable: represents each observation as a real number (e.g. Sophomore=2)
4. visualizing data distributions:
  - frequency table
  - histogram
  - pie chart
  - stem-leaf plot
  - box-whisker plot
5. relative frequency (probability density function PDF)
6. cumulative frequency (cumulative distribution function CDF) - running total
7. be able to fill in missing entries in a distribution table
8. shape: symmetric, left/right skewed, bell, uniform, bi-modal
9. statistic - numerical value that summarizes some aspect of the data set
  - location: arithmetic mean  $\bar{x} = \frac{\sum x_i}{n}$ , median, mode, quartiles
  - dispersion: range, IQR, standard deviation  $s$ , variance  $s^2$
10. 5 number summary, outliers
11. weighted mean (observations/measurements in L1, put the weights/frequencies in L2)
$$\bar{x} = \frac{\sum x_i w_i}{\sum w_i}$$
12. be able to read an Excel printout and answer questions about the distribution
13. use the CDF column to get percentiles
14. interpretations:
  - mean (reflects total) vs median (reflects typical)
  - 50% of data between  $Q_1$  and  $Q_3$
  - lower standard deviation - more consistent, predictable
  - z-score:  $z = \frac{x - \bar{x}}{s}$  gives unit/scale neutral measure of position relative to the mean
15. be able to set up and solve an algebraic equation to find unknown values
16. percentages, proportions, ratios
17. per-capita statistics (population of U.S. is about 315 million)
18. geometric mean
  - percent change  $\rightarrow$  compounding factor  
e.g. up 25% is a factor of 1.25, and down 25% is a factor of 0.75

- if you know all the factors, multiply and take the  $n$ th root

$$\bar{x}_g = (x_1 \cdot x_2 \cdot x_3 \cdots x_n)^{1/n}$$

- if you know the starting and final values,

$$\bar{x}_g = \left( \frac{\text{finish}}{\text{start}} \right)^{1/n}$$

- to convert to an average percent change, subtract 1  
e.g. 1.07 factor corresponds to 7% growth, 0.93 factor corresponds to 7% decay.

19. probability of an event “E”

(a)  $0 \leq P(E) \leq 1$

(b) the complement of  $E$  (“not E”) is denoted  $\bar{E}$

$$P(\bar{E}) = 1 - P(E)$$

20. types of probability:

- (a) empirical probability: relative frequency of historical results, experiments, simulations
- (b) subjective probability: educated guess based on the knowledge/belief of the observer
- (c) theoretical probability: mathematical model, deductive reasoning