Math/Stat 3850 – Take Home Quiz 1

This quiz should take you approximately 25 minutes. You may use R, the internet, and any reference material, but do not work together and do not get help (except from Dr. Clair).

(10) 1. Consider the data frame **USJudgeRatings** which is built in to R.
   (a) How many variables are there, and what type are they?

   (b) How many observations are there?

   (c) What is the mean of **RTEN**, the “worthy of retention” rating?

   (d) What is the maximum rating for prompt decisions, the **DECI** variable?

   **Solution:** a. 12 numeric. b. 43. c. 7.602326. d. 8.8.

(10) 2. This problem uses the **Batting** data frame from the Lahman library.
   (a) Which player had the most times caught stealing (CS) in a single season, and how many times were they caught? In the space below your answer, write the R code you used to find this.

   **Solution:** henderi01 (Rickey Henderson) caught 42 times in 1982.
   library(dplyr); head(arrange(Batting,desc(CS)))

   (b) Which player had the second most times caught stealing in a single season, and how many times were they caught?

   **Solution:** cobbty01 (Ty Cobb) caught 38 times in 1915.

   (c) Which player was caught stealing the most in a season since 2000?

   **Solution:** pierrju01 (Juan Pierre) caught 24 times in 2004.
3. Suppose you select a person at random and ask what month they were born.
   (a) What is the sample space for this experiment?
   Solution: \{ Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec \}
   (b) Are the events "born in July" and "born in summer" independent? Are they disjoint?
   Solution: They are not independent. They are not disjoint.
   (c) Are the events "born in July" and "born in winter" independent? Are they disjoint?
   Solution: They are not independent. They are disjoint.

4. According to the 2006 Gallup Lifestyle Poll:
   - 27% of Americans own a dog, but do not own a cat
   - 12% of Americans own a cat, but do not own a dog
   - 17% of Americans own both a cat and a dog.
   (a) What is the probability that a randomly selected American owns a dog?
   (b) What is the probability that a randomly selected American owns no cats and no dogs?
   (c) What is the probability that a dog owner also owns a cat?
   Solution: a. 0.44; b. 0.44; c. \( P(C|D) = 0.386 \).

5. Estimate the probability that the sum of six ordinary dice is larger than 23.
   Give your answer to two decimal places and write your R code in the space below.
   Solution: mean(replicate(100000,sum(sample(1:6,6,replace=TRUE)) > 23))
   0.28