

MTH245 Homework 9

Open the file U4M1 Assessment File.xlsx. You will see that it contains data for the 2013 Major League Baseball players. Use the data to find the following, be sure to organize your results and label them neatly.

1. Find the mean, median and mode for the age of the players. Which do you think is the best representation of the age of a “typical” MLB player?
2. Find the 5 quartiles for the salaries of the players.
3. This will be a variation of what you found for question 2, but removing some of the outliers from the data set: Find the 1st, 25th, 50th, 75th and 99th percentiles for the salaries of the players.
4. Compare your results for 2 and 3, how much of an effect does removing the players with the top and bottom 1% of salaries have?
5. Make a histogram for the ages of the players. Does the histogram change your opinion of the best representation of the age of a “typical” MLB player?

These may be easier to do on paper:

6. Calculate the expected payoff for the following game: Two fair die are rolled. If the sum is 7, you will win \$10. If the sum is 11, you lose \$20. For any other outcome, you will lose \$1. (Hint, review Unit 3 Module 1 for probabilities for rolling two dice.)

7. A charity runs a Casino Night and features a gambling game where a fair coin is flipped three times. The game will cost you \$1 each time you play, and has prizes of:

# Heads	Prize Value
0	\$0.25
1	\$0.50
2	\$1.00
3	\$2.00

- a) What is the expected value of the prize?
- b) If the charity wants to raise \$3000, about how many games need to be played? Explain your answer.

8. In most industrialized countries the birthrate for boys is slightly higher than for girls. The chance of a mother giving birth to a boy is about 51.2%. Can you turn this statistic into a profitable--but likely illegal--business? Grab your crystal ball and head to the local maternity ward. You will charge pregnant women \$10 to predict the gender of their child, and will, of course, always predict that the child will be a boy. If you are wrong, you can give the mother back her \$10.

a) If you can get 1000 women to pay for your prediction, and return the money to all of the mothers having girls, how much profit will you expect to make? (Let's just ignore the possibilities of multiple births.)

b) Now, how likely are the mothers with girls to actually track you down and demand their money back? Let's say that 40% bother, what is your expected profit now?

9. The state of Oregon wishes to design a new lottery game with the following rules:

- Each ticket costs \$5
- There will be three prizes: \$10, \$100 and \$1000
- The probability of the \$10 prize will be 20%.
- The probability of the \$100 prize will be 1%
- Ten thousand tickets will be sold each month.

What should the probability for the \$1000 prize be set at, if the state would like, on average, to earn \$10,000 each month?