TA’S NAME:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Problem Set #3**

*Researchers at Johns Hopkins University recently determined that the mean batting average of all Major Leagues Baseball players in 1954 was 0.265, with a standard deviation of 0.035. In 2004, they noted, the mean batting average of all Major Leagues Baseball players was higher --- 0.275 --- with a somewhat smaller standard deviation of 0.030. In both years, the distribution of batting averages followed a standard normal curve. To summarize:*

*Year Mean Batting Average Standard Deviation of Batting Averages*

1954 0.265 0.035

2004 0.275 0.030

1. In which year was there more variability in the distribution of batting averages? Explain the reasoning behind your answer.
2. In 1954, Ted Williams had a batting average of 0.345. Roughly what proportion of players had batting averages as high or higher than Williams in that year? *Show your work*.
3. Approximately what proportion of batters had batting averages between 0.200 and 0.300 in 1954? *Show your work*.
4. In 2004, Torii Hunter had a batting average of 0.271. Roughly what proportion of players had batting averages as low or lower than Hunter that year? *Show your work*.
5. Approximately what proportion of batters had batting averages between 0.200 and 0.300 in 2004? *Show your work*.
6. Given these data, in which year would it be *more* surprising to observe a batter with a batting average at or above 0.400? Explain the reasoning behind your answer.
7. Psychologists know that 10% of Americans are left-handed. What is the probability of drawing a random sample of 2,000 Americans and observing that 12% or more of the sample members are left handed?
8. I learned at the 2019 Minnesota State Fair that pregnant sows typically give birth to 10 piglets, with a standard deviation of 2 piglets. If we randomly selected 100 pregnant sows from the population for which these parameters hold, then what is the probability that the mean number of piglets born to these sows would 10.5 or lower?