Practice Problems 4: *Uniform & Normal Distribution*

A. From your Book:

- Chapter 4 (all examples and exercises)

B. Additional Problems:

1. The random variable U follows a uniform $U[25, 50]$ distribution.
   (a) Find the pdf of U.
   (b) Calculate the mean and the variance of U.
   (c) What is the probability that U is between 32 and 34?
   (d) If we know that U is between 30 and 40, what is the probability that U is between 32 and 34?

2. Compute the following probabilities

   (a) $\mathbb{P}(Z > 1.25)$ (b) $\mathbb{P}(Z < -0.40)$
   (c) $\mathbb{P}(Z < 0.80)$ (d) $\mathbb{P}(0.40 < Z < 1.30)$
   (e) $\mathbb{P}(-0.30 < Z < 0.90)$ (f) $\mathbb{P}(Z < -1.5 \text{ and } Z < 1.5)$

   (Sketch the normal curve and shade the appropriate area each time.)

3. Consider the population of all American women. We select a woman at random. Her height is a random variable that follows the normal distribution with mean 64 inches and standard deviation 2.5 inches. What is the probability that
   (a) her height is above 72 inches?
   (b) her height is above 64 inches?
   (c) her height is below 60 inches?
   (d) her height is between 62 and and 68 inches?

4. In a physics class the first quiz scores are normally distributed with mean 50 and standard deviation 10.
   (a) Find the z-score (i.e. standardize) of the following quiz scores: 60, 45, 75.
   (b) Find the quiz scores (i.e. unstandardize) that correspond to the following z-scores: 0, +1.5, -2.8.

5. In a law school class, the entering students LSAT scores are normally distributed with average 160 and standard deviation 10.

(a) What is the probability that a randomly selected student scores below 166?

(b) One student was 0.5 standard deviations above the average on LSAT. About what percentage of students had lower scores than he did?

6. For UCSB freshmen, the average GPA is normally distributed with mean 3.0 and standard deviation 0.5. Compute the 30th percentile of the GPA distribution.

7. Suppose that a price of a particular stock on Monday is equally likely to take *any* price between \$20 and \$30 or *any* price between \$40 and \$50.

   (a) Is the price of the stock on Monday a continuous or a discrete random variable?

   (b) Can you draw the probability histogram that represents the price of the stock (under the above model)?

   (c) Is the stock normally distributed under this model?