1. Montgomery 2-2

2. Montgomery 2-7

3. Suppose I generate 10 random variables in the following manner. I first generate a variable \( X \) from a Normal distribution with mean 5 and variance 1. I then randomly sample 10 variables \( Y_1, Y_2, ..., Y_{10} \) from a Normal with mean 0 and variance \( \frac{1}{2} \) and add the variable \( X \) to each one. This creates 10 random variables

\[ Z_i = X + Y_i \quad i = 1, 2, ..., 10. \]

a. What is the \( \text{E}(Z_i) \)?
b. What is the \( \text{Var}(Z_i) \)?
c. What is the \( \text{E}(\bar{Z}) \)?
d. What is the \( \text{Var}(\bar{Z}) \)?

4. Montgomery 2-20

5. Montgomery 2-21

6. Montgomery 2-25