PROBLEMS

1. A statistics quiz had a maximum score of 10. Twenty-one students received the following scores:

Student	Score
1	3
2	9
3	6
4	5
5	7
6	4
7	5
8	2
9	7
10	1
11	8
12	3
13	5
14	6
15	9
16	4
17	5
18	1
19	7
20	4
21	2

   a. Compute the mean and the variance *of this sample.*
   b. Assume that the sample is a random sample from a very large population. Estimate the population mean and variance from the sample. How do these estimates differ from your answers in question a? If they differ, why do they differ?

2. Suppose we are interested in the amount of beer served in mugs at O'Banion's Tavern. We obtain a sample of eight mugs of beer and discover that they contain the following amounts of beer.

Mug	Amount of Beer (ounces)
1	$x_1 = 15.5$
2	$x_2 = 16.2$
3	$x_3 = 14.8$
4	$x_4 = 16.0$
5	$x_5 = 16.0$
6	$x_6 = 15.9$
7	$x_7 = 16.3$
8	$x_8 = 16.5$

a. Compute the mean, variance, and standard deviation of this sample.
b. Estimate the mean, variance, and standard deviation of the *population* of amounts of beer served at O'Banion's.
c. Estimate the variance of the distribution of sample means that this sample mean comes from.

3. Suppose you have the following scores that come from some population:

$x_1 = 2$

$x_2 = 4$

$x_3 = 4$

a. Compute the variance S^2 of this sample.
b. Estimate the variance σ^2 of the population distribution that this sample was drawn from.
c. Estimate the variance σ^2_M of the population distribution that the *mean* of this sample comes from.

4. For the data of Chapter 2, problem 1, estimate the variance of the population that each set of scores comes from.

5. a. Use the data from Chapter 7, problem 8. For each of the two groups, estimate *both* the variance of the population that the scores come from and the variance of the distribution that the sample mean comes from.
b. Do the same using the data from Chapter 7, problems 10 and 11.

6. Joe Smith is test manager for Fonda motorcycles and is testing the amount of time it takes Fondas to do the standing quarter-mile.
a. A prototype Fonda shows the following times in six different trials:
Trial 1: 10 seconds
Trial 2: 11 seconds
Trial 3: 10 seconds
Trial 4: 9 seconds
Trial 5: 10 seconds
Trial 6: 12 seconds
What is your best estimate of the variance of standing quarter-mile times for this particular prototype Fonda?
b. Joe is now given a random sample of five production Fondas that show the following standing quarter-mile trials:
Fonda 1: 9 seconds
Fonda 2: 12 seconds
Fonda 3: 15 seconds
Fonda 4: 8 seconds
Fonda 5: 10 seconds
What is your best estimate of the variance of standing quarter-mile times for production Fondas?