**Assignment 4.**

**5.76 The cost of Internet access.**

In Canada, households spent an average of $68 monthly for high-speed broadband access.23

Assume that the standard deviation is $22. If you ask an SRS of 500 Canadian households with

broadband access how much they pay, what is the probability that the average amount will exceed

$70?

**5.82 Genetics of peas.**

According to genetic theory, the blossom color in the second generation of a certain cross of sweet peas should be red or white in a 3:1 ratio. That is, each plant has probability 3/4 of having red blossoms, and the blossom colors of separate plants are independent.

(a) What is the probability that exactly 9 out of 12 of these plants have red blossoms?

(b) What is the mean number of red-blossomed plants when 120 plants of this type are grown from seeds?

(c) What is the probability of obtaining at least 80 red-blossomed plants when 120 plants are grown from seeds?

**5.83 The weight of a dozen eggs.**

The weight of the eggs produced by a certain breed of hen is Normally distributed with mean 66

grams (g) and standard deviation 6 g. If cartons of such eggs can be considered to be SRSs of size 12 from the population of all eggs, what is the probability that the weight of a carton falls between 755 and 830 g?

**5.86 Learning a foreign language.**

Does delaying oral practice hinder learning a foreign language? Researchers randomly assigned 25 beginning students of Russian to begin speaking practice immediately and another 25 to delay speaking for four weeks. At the end of the semester both groups took a standard test of

comprehension of spoken Russian. Suppose that in the population of all beginning students, the test scores for early speaking vary according to the *N*(32, 6) distribution and scores for delayed speaking have the *N*(29, 5) distribution.

(a) What is the sampling distribution of the mean score x¯ in the early-speaking group in many

repetitions of the experiment? What is the sampling distribution of the mean score ȳ in the delayed speaking group?

(b) If the experiment were repeated many times, what would be the sampling distribution of the

difference y¯−x¯ between the mean scores in the two groups?

(c) What is the probability that the experiment will find (misleadingly) that the mean score for

delayed speaking is at least as large as that for early speaking?

**5.87 Summer employment of college students.**

Suppose (as is roughly true) that 88% of college men and 82% of college women were employed last summer. A sample survey interviews SRSs of 400 college men and 400 college women. The two samples are of course independent.

(a) What is the approximate distribution of the proportion p^*F* of women who worked last summer? What is the approximate distribution of the proportion p^*M* of men who worked?

(b) The survey wants to compare men and women. What is the approximate distribution of the

difference in the proportions who worked, p^M−p^F? Explain the reasoning behind your answer.

(c) What is the probability that in the sample a higher proportion of women than men worked last summer?