Problem 1

The Bureau of Labor Statistics collects information on the ages of people in the civilian labor force and publishes the results in *Employment and Earnings*. Fifty people in the civilian labor force are randomly selected; their average age is $\bar{x} = 38.8$. Assume that the population standard deviation of the ages is 12.1 years.

(a) Determine the sample size needed in order to be 95% confident that the mean age, μ, of all people in the civilian labor force is within 0.5 year of the estimate $\bar{x}$.

(b) Find a 95% confidence interval for μ for a sample of the size determined in part (a).

Problem 2

Nonexercise activity thermogenesis (NEAT) provides a partial explanation for the results you found in the previous analysis. NEAT is energy burned by fidgeting, maintenance of posture, spontaneous muscle contraction, and other activities of daily living. In the study of the previous exercise, the 16 subjects increased their NEAT by 328 calories per day, on average, in response to the additional food intake. The standard deviation was 256.

(a) Test the null hypothesis that there was no change in NEAT versus the two-sided alternative. Summarize the results of the test and give your conclusion.

(b) Find a 95% confidence interval for the change in NEAT. Discuss the additional information provided by the confidence interval that is not evident from the results of the significance test.

Problem 3

A study of iron deficiency among infants compared samples of infants following different feeding regimens. One group contained breast-fed infants, while the children in another group were fed a standard baby formula without any iron supplements. Here are summary results on blood hemoglobin levels at 12 months of age:

	n	$\bar{x}$	s
Breast-fed	38	13.9	1.6
Formula	33	12.2	1.7

Construct and interpret a 95% confidence interval for the mean difference in hemoglobin level between the two populations of infants.

Problem 4

The U.S. Department of Agriculture (USDA) uses sample surveys to produce important economic estimates. One pilot study estimated wheat prices in July and in September using independent samples of wheat producers in the two months. Here are the summary statistics, in dollars per bushel:

Month	n	$\bar{x}$	s
September	45	\$3.61	\$0.19
July	90	\$2.95	\$0.22

The September prices are higher on the average. But we have data from only a sample of producers each month. Can we conclude that national average prices in July and September are not the same? Or are these differences merely what we would expect to see due to random variation?