(1) Normal distribution: Assume that the level of income per family in Albany is normally distributed with the average of 29K.

1-a: If 68% of the families earn between $20,000 and $38,000, what is the standard deviation of this distribution?

1-b: Assume the poverty line is on 15K. What percentage of families is below the poverty line?

(2) Sample mean: Assume the average of years of education in Albany is 13 years with the standard deviation of 5 years. We take a sample of 100 people.

2-a: What is the probability that the average of years of education in our sample becomes less than 12 years?

2-b: What is the probability that the average of years of education in our sample becomes between 12 years and 13.5 years?

(3) Sample proportion: Assume 35% of adults smoke. If our class is an SRS of the population (assume we have 36 students), what is the probability that more than half of the students smoke?

(4) Gasoline consumption (Fall09-test2): A record was kept of the miles per gallon of gasoline used by a particular high-milage hybrid car. We have twenty observations, found by computing the miles per gallon each time the gas tank was filled. At the right are the 20 observations of the miles per gallon (mpg) used in successive tankfuls of gas for this particular car.

41.5	50.7
36.6	37.7
34.2	45.0
48.0	43.2
47.7	42.2
43.2	44.6
48.4	46.4
46.8	39.2
37.3	43.5
44.3	43.3

The mean of this sample of 20 observations is $\bar{x}$ = 43.2.

(4a) Suppose that the standard deviation for miles per gallon for this type of car is known to be σ = 3.5 mpg. Find a 95% confidence interval for μ, the mean mpg for this type of vehicle.

(4b) The manufacturer claims the average for this car is 45 miles per gallon. The data suggest it's less. Can you reject the manufacturer's statement at some level of significance (.05 or below)? State proper hypotheses to test the manufacturer's claim.

(5) (Fall09-test2) The online poll site www.twiigs.com posted the following poll question September 5, 2009.

"Some critics have argued that the Obama administration is taking on too much, while others believe the president is fulfilling campaign promises. What's your assessment?**"**

The results it lists now on its web site are:

1 Obama has taken on too much: 26%

2 The White House is taking the right approach: 36%

3 The president isn't taking on enough: 3%

4 The administration isn't acting on the right issues: 12%

5 Right issues, wrong approach: 21%

Total Votes: 2,576

(a) Assuming that this poll is representative of the U.S. adult population, find a 95% confidence interval for the proportion of U.S. adults who think President Obama has taken on too much.

(6) t-test: We would like to know about the average expenditure of UAlbany students. We take an SRS, and the average result is $650 per month per person. We would like to find the true value in the population with 95% confidence under each of these conditions:

a – when the standard deviation in our population is $100 and n=40.
b- when we don't know the standard deviation in our population, but the standard deviation in our sample is $100 and n=40.
c- when the standard deviation in our population is $100 and n=10.

(7) (Fall09-test2) Short questions, short answers:

(a) What value of Z would be used to compute the margin of error for a 90% confidence interval?
(b) Which is larger, a 95% confidence interval or a 99% confidence interval?
(c) Which is larger, a 95% confidence interval based on a sample size of 400 or 800?
(d) What is the intuitive meaning of "p-value" in a hypothesis test?
(e) Under what conditions we should perform t-test instead of z-test?