Math 119 Name: _____

FINAL

MATH 119 – SPRING 2013 – KUNIYUKI
126 POINTS TOTAL, BUT 120 POINTS = 100%

Show all work, simplify as appropriate, and use "good form and procedure" (as in class). No notes or books allowed. A scientific calculator is allowed.

You may detach the attached tables and write on them. Turn in the tables with your test, but any work written on them will not be graded.

• **When rounding**, round off to at least four decimal places or four significant digits, whichever is more **detailed**. Round off final z values to two decimal places. Round off final t and χ^2 values to three decimal places.

• Assume that finite population correction factors do not apply.

• Do not use continuity corrections.

FOR PROBLEM 1, USE THE *P*-VALUE METHOD OF HYPOTHESIS TESTING.

Remember to:

- State the null and alternative hypotheses using notation (as in class), and identify which is the claim.
- Compute the value of the appropriate test statistic.
- Give the corresponding *P*-value.
- State whether or not the null hypothesis is rejected; this is your "decision."
- Write your final conclusion relative to the claim using the kind of wording we used in class.

1) (19 points). The weights of men in the United States have mean 172 pounds and standard deviation 29 pounds. A men's weight loss program claims that the mean weight of clients who have completed the program is less than 172 pounds. We randomly sample 40 men who have completed the program. Their average weight is 165 pounds. Use a significance level of 0.01 to test the program's claim. Assume that the standard deviation of the weights of the clients who have completed the program is 29 pounds (we're probably being conservative). Use the *z* table and the *P*-value method of hypothesis testing.

FROM NOW ON, USE THE TRADITIONAL (CLASSICAL) METHOD OF HYPOTHESIS TESTING.

Remember to:

- State the null and alternative hypotheses, and identify which is the claim. You must use the kind of notation that we have used in class.
- Compute the value of the appropriate test statistic.
- Find the critical value(s), and indicate the critical region.
- State whether or not the null hypothesis is rejected; this is your "decision."
- Write your final conclusion relative to the claim using the kind of wording we used in class.

2) (21 points). The weight loss program randomly selects seven of its clients and requires them to count their consumed calories on a particular day. The average number of calories consumed by the seven selected clients is 1550 calories, and the sample standard deviation is 117 calories. Use a significance level of 0.01 to test the claim that the average number of calories consumed by the program's clients on that day is 1500 calories. Assume that the numbers of calories consumed by the clients on that day are approximately normally distributed. Use the *t* table and the traditional (classical) method of hypothesis testing.

3) (23 points). Governor Jerry Brown claims that more than 55% of registered voters in California approve of the job he is doing as Governor. A polling firm takes a random sample of 600 registered voters in California, and 356 of them approve of the job Governor Brown is doing. Use a significance level of 0.05 to test Governor Brown's claim. Use the *z* table and the traditional (classical) method of hypothesis testing. You may assume that we can use the normal approximation to the binomial distribution. When rounding, round off to at least four significant digits. Hint: The test statistic is given by:

$$z = \frac{\hat{p} - p}{\sqrt{\frac{pq}{n}}}$$

4) (20 points). We want to compare the felony prison sentences handed down by judges in North Fredonia to those handed down by judges in South Fredonia. Computer records show that the lengths of felony prison sentences handed down by judges in North Fredonia have a standard deviation of 2.7 years. South Fredonia has not computerized its records, so we take a random sample of 12 lengths of felony prison sentences handed down there. The standard deviation of the sample is 4.8 years. Use a significance level of 0.10 to test the claim that the standard deviation of the lengths of felony prison sentences handed down in South Fredonia is equal to that of North Fredonia. Assume that the lengths of the felony prison sentences handed down in South Fredonia are very close to normally distributed. Use the χ^2 table and the traditional (classical) method of hypothesis testing. Hint: The test statistic is given by:

$$\chi^2 = \frac{(n-1)s^2}{\sigma^2}$$

# of degrees of freedom = $n-1$

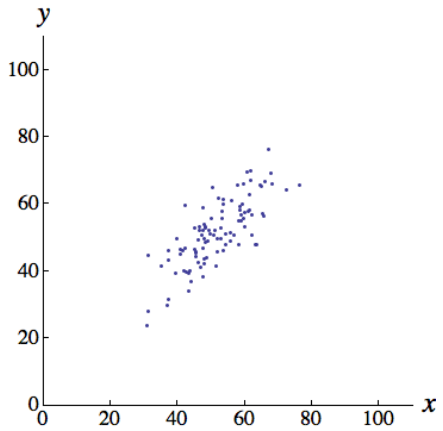
5) (8 points total). (Matching)

For each variable, the average is 50 and the standard deviation is 10.

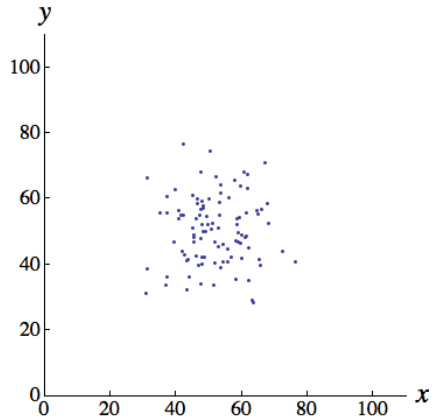
- For one of the graphs below, $r = -0.90$.
- For one of the graphs below, $r = 0.00$.
- For one of the graphs below, $r = 0.80$.
- For one of the graphs below, $r = 0.95$.

Fill in the blanks:

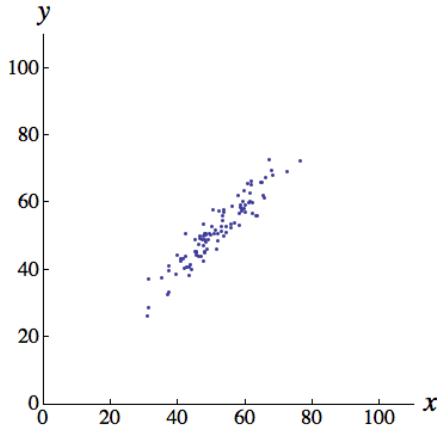
a) r for the graph below is _____.



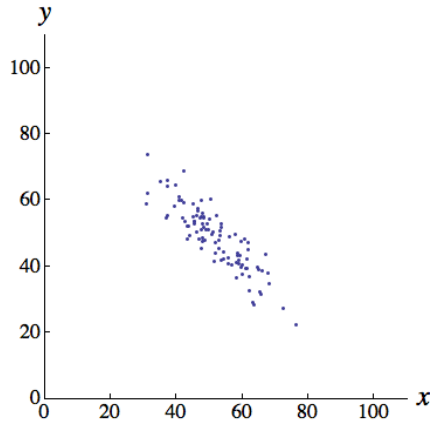
b) r for the graph below is _____.



c) r for the graph below is _____.



d) r for the graph below is _____.



6) (3 points). Fill in the blank: If a regression line for sample data is given by $\hat{y} = 5 + 8x$, then, along the regression line, for every increase of 1 unit in x, there is an increase of _____ units in y.

7) (32 points). Randomly selected faculty and students at a large college were asked if they favored or opposed the increasing use of standardized tests at the college. The results are summarized in the table below. Test the claim that the response is independent of whether the subject is a faculty member or a student. Use a significance level of 0.10. Use the χ^2 table and the traditional (classical) method of hypothesis testing.

	Faculty	Students
Favor	25	50
Oppose	60	165

When rounding, round off to at least four decimal places.
You may round off your final test statistic value to three decimal places.

Hint: The test statistic is given by:

$$\chi^2 = \sum \frac{(O-E)^2}{E}$$

$$\#\text{ of degrees of freedom} = (\#\text{ rows} - 1)(\#\text{ columns} - 1)$$