Stat 145 Final Exam (50 pts) - Fall 2009

Name:_____

Circle your section number & instructor below:

001:Greenberg	002:Fink	003:Wadsworth	004:Greenberg	005:Christenson	006:Wilson
007:Unnever	008:Hattab	009:Wong	010:Greenberg	011:Greengross	012:Lee
013:Unnever	014:Greengross	015:Jadall	016:Buser	019:Greenberg	

For credit show or explain all answers.

1. Marine scientists are studying great white sharks. Here are lengths in meters of an SRS of 20 great whites measured:

17.6	12.4	17.9	16.6	14.8	18.7	16.4	15.9	18.3	14.6
15.2	14.3	15.7	16.1	13.7	19.3	16.2	17.3	13.2	15.5

(a) (2 pts.) Make a stem plot of these data.

(b) (1 pt) Does it seem safe to use the t procedures to analyze these data? Explain.

(c) (2 pts.) Regardless of your answer above, given x-bar = 15.99 and s = 1.85 find a 95% confidence interval for the mean length of great whites.

(d) (2 pts.) Interpret the interval above.

2. Clients at a transitional housing facility for recently released female prisoners must return to prison if they are caught using illegal drugs or alcohol. A social worker at the facility is interested in the proportion of female prisoners that return to prison from using illegal drugs or alcohol. She analyzes the records of 137 clients that entered a transitional housing facility since it opened five years ago. Of these 137 clients 29 returned to prison due to substance abuse

     (a) (2 pt.) Explain in words what the parameter p is.

     (b) (1 pt.) Give the numerical value of the statistic "p-hat" that estimates p.

     (c) (2 pts.) Give a 99% confidence interval for p.

     (d) (4 pts.) Is there evidence that the proportion of all females in transitional housing that return to prison from substance abuse is over 20%? State hypotheses, calculate the test statistic, approximate the P-value, and state your conclusion in terms of the problem.

3. Three anesthetized newts are wounded with razor cuts on both their hind limbs. The skins natural electric field is reduced to half on the "experimental" limb; no treatment is applied to the other "control" limb. Healing rates (micrometers/hour) for each newt are listed below:

Control Limb	Experimental Limb
22	18
48	37
37	31

(a). (3 pts.) Compute the difference (control limb minus experimental limb) for each subject. Give the mean and standard deviation of the <u>differences</u>. (SHOW YOUR WORK).

(b). (4 pts.) Does this match pairs study give evidence that reduced electric fields reduce skin healing rates? State hypotheses, calculate the test statistic, approximate the P-value, and state your conclusion in terms of the problem.

4. A study comparing body temperature between males and females was conducted. Results are listed below:

Gender	n	x-bar	s
Females	65	98.50	0.73
Males	62	98.21	0.71

Let u_1 and u_2 represent the mean body temperatures of all female and male responses, respectively.

(a) (4 pts.) Does this data give evidence that male and female body temperatures differ? State hypotheses, calculate the test statistic, approximate the P-value, and state your conclusion in terms of the problem.

(b) (2 pts.) Give a 90% confidence interval for $u_1 - u_2$.

(c) (2 pts.) Interpret the interval above.

5. (3 pts.) A survey was conducted to determine the proportion p of United States residents who support health care reform. How many registered voters should be sampled in order to estimate p within ± 0.03 with 99% confidence? *(Note: US residents who support health care reform is expected to be between 0.3 and 0.7).*

6. Is there a relationship between couples living together before marriage and whether or not they later become divorced? The number of divorces were recorded from couples who lived together before marriage and from those who did not. The observed data are:

	divorced	not divorced
lived together	25	14
did not live together	12	21

(a) (2 pts) Fill in the table below with the expected cell counts rounded to one decimal place. Show your work inside each cell.

	divorced	not divorced
lived together		
did not live together		

(b) (2 pts) Compute the value of the chi-square test statistic.

(c) (2 pts) Determine the P-value for the chi-square test statistic given above.

(d) (2 pts) State your conclusion in terms of the problem.

7. Select the word(s) from the following alphabetized list that best completes the sentences below, and write the word(s) in the blank space provided.

Word List: bias, categorical, confounding, correlation, distribution, experiment, factor, frequency, p-value, inference, margin of error, probability, quantitative, regression, robust, sampling, standard error, simple random sample, treatment, variability, z-score, stratified random sample

(a) (1 pt) The _____ of any outcome of a random phenomenon is the proportion of times the outcome would occur in a very long series of repetitions.

(b) (1 pt) The probability, assuming that the null hypothesis is true, that the test statistic would take a value as extreme or more extreme than that actually observed is called the _____ of the test.

(c) (1 pt) Statistical _____ provides methods for drawing conclusions about a population from sample data.

(d) (1 pt) A _____ of size n consists of n individuals from the population chosen is such a way that every set of n individuals has an equal chance to be the sample actually selected.

(e) (1 pt) A _____ line is a straight line that describes how a response variable y changes as an explanatory variable x changes.

(f) (1 pt) The _____ of a variable tells us what values the variable takes and how often it takes these values.

(g) (1 pt) When the standard deviation of a statistic is estimated from data, the result is called the _____ of the statistic.

(h) (1 pt) The _____ measures the direction and strength of the linear relationship between two quantitative variables.