## HW 8 is due on Monday, Oct. 21. Two pages: problems A)- H)

A) A Gallop poll found that 51% of people in the sample said "Yes" when asked "Would you like to lose Weight?" Gallop announced "For results based on the total sample of national adults, one can say with 95% confidence that the margin of sampling error is  $\pm 3$  percentage points."

a) What is the 95% confidence interval for the percent of all adults who want to lose weight?

b) What does it mean to say we have 95% confidence in this interval?

comment: 95% CI is estimate  $\pm$  margin of error. See p. 361-362.

B) A student reads that a 95% confidence interval for the mean NAEP quantitative score for men of ages 21 to 25 is 267.8 to 276.2. Asked to explain the meaning of this interval, the student says "95% of all young men have scores between 267.8 and 276.2." Is the student right? Justify your answer.

comment: Estimators for the mean are not estimators for individuals.

C) 14.5b Below are the IQ scores of 31 7th grade girls in a Midwest school district. Treat the 31 girls as a SRS of all 7th grade girls in the school district. Suppose the standard deviation of IQ scores in this population is known to be  $\sigma = 15$ . Give a 99% confidence interval for the mean score in the population.

114	100	104	89	102	91	114	114	103	105	
108	130	120	132	111	128	118	119	86	72	
111	103	74	112	107	103	98	96	112	112	93

comment: You need to compute the sample mean using p. 40. (See quiz 1 and 2.) Follow Example 14.3 on p. 359.

D) High school students who take the SAT mathematics exam a second time generally score higher than on their 1st try. The change in score has a normal distribution with standard deviation  $\sigma = 50$ . A random sample of 1000 students gains an average of  $\overline{x} = 22$  on the 2nd try.

a) Give a 95% confidence interval for the mean score gain  $\mu$  in the population of all students.

b) What are the margins of error for 90%, 95% and 99% confidence? How does increasing the confidence level affect the margin of error of a confidence interval?

comment: Margin of error is defined on p. 361. Also see p. 364. For b), make a table with headers level,  $Z^*$ , and m.

E) How large a sample of school girls in HW problem C) would be needed to estimate the mean IQ score  $\mu$  within  $\pm 5$  points with 99% confidence?

comment: Use formula  $n = (z^* \sigma/m)^2$  on p. 401-4. Do not forget to round up. Margin of error = m = half the CI length. Get  $\sigma$  from problem C).

F) A poll on women's issues interviewed 1025 women and 472 men randomly selected from the United States, excluding Alaska and Hawaii. The poll announced a margin of error of  $\pm 3$  percentage points for 95% confidence in conclusions about women. The margin of error for results concerning men was  $\pm 4$  percentage points. Why is this larger than the margin of error for women?

comment: Recall that bigger samples are more accurate.

YOU NEED TO KNOW HOW TO READ MINITAB and R OUTPUT FOR EXAMS. See R handout that is also at (http://parker.ad.siu.edu/Olive/zM282Rhelp.pdf). Copy and paste code from (http://parker.ad.siu.edu/Olive/M282Rhw.txt).

G) From the following Mintab output, write down the confidence interval. A sociology class randomly selected 37 obituaries from the a large city's largest newspaper, and the output is for the mean age at deaths for women computed from the 19 women.

from the

Z Confidence Intervals The assumed sigma = 15.0 Variable N Mean StDEv SE mean 95 % CI DAgeF 19 75.53 13.15 3.44 (68.78, 82.27)

H) R problem. This problem computes the 95% t confidence interval for the mean tail length of a certain type of lizard from a sample size of n = 24. Copy and past the *R* commands for this problem into *R*. Write the confidence interval as an interval on your homework.

You should get the following output.

[1] 8.292017 9.499649
attr(,"conf.level")
[1] 0.95