Statistics AP Chapter 10 Review:

1. In statistics, what is meant by a 95% *confidence interval*?

2. Does a 95% *confidence interval* mean there is a 95% probability that the mean is in our interval? Why or why not? NOTE: This statement is one of the most common mistakes made by elementary students of statistics. (read last paragraph on page 554.)

3. Sketch and label a *95% confidence interval* for the standard normal curve.

4. Sketch and label a *90% confidence interval* for the standard normal curve.

5. Find z* for the following confidence levels:

a) 80%	d) 85%
b) 98%	e) 90%
c) 75%	f) 99%

6. What is meant by a *margin of error*? The margin of error only covers specifically what kind of error? (see p.668)

7. Why is it best to have high *confidence* and a small *margin of error*?

8. What happens to the *margin of error* as *z** decreases? If you want a smaller z*, should you choose a higher or lower confidence level?

9. What happens to the *margin of error* as σ (or s) decreases?

10. What happens to the *margin of error* as *n* increases?

11. By how many times must the sample size *n* increase in order to cut the *margin of error* in half?

12. Find the minimum sample size needed for the following:

a) You are interested in the average number of social media sites used by teens. Research suggests that $\sigma = 2$. You want to construct a 95% confidence interval with a margin of error no more than 1.5.

b) You are interested in the proportion of students who love math. You want to construct a 90% confidence interval with a margin of error no more than .08.

c) You are interested in the proportion of students who applied to UC schools. Based on national data, the proportion of all students in CA who apply to UC schools is 30%. You want to construct a 99% confidence interval with a margin of error no more than .03.

13. Find the standard error AND margin of error for the given situations:

a) Mrs. Skaff conducts a survey and finds that 82 out of 160 students know where the "F" building is on NPHS campus. She wants to find a 95% confidence interval to predict the true proportion of students who know this information.

b) A car company finds that the average mpg for a sample of 50 cars is 23 and that the standard deviation for this sample is 1.3. The company wants to construct a 90% confidence interval.

c) Shoes 4 Less wants to predict their average sales per day. In a sample of 100 days, they sold an average of 57 pairs of shoes. The standard deviation for shoe sales across all days is 2.3. The company wants to construct a 99% confidence interval.

For #'s 14 – 17, do a FULL PROCESS (**SPCI**)

14. If 64% of a sample of 550 shoppers leaving a shopping mall claim to have spent over $25,

a. determine a 99% confidence interval for the proportion of all shoppers who spend over $25.

b. Shopping mall management claims that 75% of all shoppers spend over $25 at their mall per trip. What does your confidence interval say about this claim?

15. Acute kidney transplant rejection can occur years after the transplant. In one study, 21 patients showed rejection when the ages of their transplant were as follows (in years):

9	**2**	**7**	**1**	**4**	**7**	**9**	**6**	**2**	**3**	**7**
6	**2**	**3**	**1**	**2**	**3**	**1**	**1**	**2**	**7**	

Establish a 90% confidence interval estimate for the ages of the kidney transplants that undergo rejection.

16. Suppose your class is investigating the weights of Snickers 1-ounce Fun-Size candy bars to see if customers are getting full value for their money. Assume that the weights are Normally distributed with a standard deviation $\sigma = 0.005$ ounces. Several candy bars are randomly selected and weighed. The weights are

0.95 1.02 0.98 0.97 1.05 1.01 0.98 1.00

ounces. We want to determine a 90% confidence interval for the true mean, μ.

17. The Macintosh Leopard operating system is advertised to be faster than the PC Vista operating system. Non-biased testers chose 12 random tasks and timed them. Find a 95% confidence interval for the difference in time between the two operating systems. Is there evidence that Leopard is faster than Vista? Explain.

Task	A	B	C	D	E	F	G	H	I	J	K	L
Leopard	12.5	29.3	9.1	24.4	19.5	28.1	3.6	39.4	45.9	28.9	17.3	50.0
Vista	11.3	32.4	9.3	30.6	22.2	28.0	3.9	42.5	55.1	31.3	14.4	53.3