1.(1 pt) Match the confidence level with the confidence interval for μ.

__ 1. $\bar{x} \pm 1.96 \left(\frac{\sigma}{\sqrt{n}}\right)$
__ 2. $\bar{x} \pm .99 \left(\frac{\sigma}{\sqrt{n}}\right)$
__ 3. $\bar{x} \pm 1.282 \left(\frac{\sigma}{\sqrt{n}}\right)$

A. 80%
B. 67.78%
C. 95%

2.(1 pt) Starting salaries of 150 college graduates who have taken a statistics course have a mean of \$43,374 and a standard deviation of \$9,611.
Using a 0.92 degree of confidence, find both of the following:
A. The margin of error E
______
B. The conficence interval for the mean μ:
______ $< \mu <$ ______

3.(1 pt) A random sample of 70 observations produced a mean of $\bar{x} = 31.3$ and a standard deviation $x = 2.96$.
(a) Find a 99% confidence interval for μ
______ $\leq \mu \leq$ ______
(b) Find a 90% confidence interval for μ
______ $\leq \mu \leq$ ______
(c) Find a 95% confidence interval for μ
______ $\leq \mu \leq$ ______

4.(1 pt) Listed below are the lenths (in minutes) of randomly selected music CDs. Construct a 96% confidence interval for the mean length of all such CDs.

53.13	47.57	56.95	27.47	51.01	54.93	52.2
48.36	38.35	59.45	39.11	52.38	52.82	48.85
42.88	47.54	35.01	51	52.78	64.99	84.93
47.64	38.89	45.57	42.62	50.28	32.47	63.2
56.12	48.97	63.8	51.17	52.67	60.84	47.19
52.85	77	66.23	37.73	51.07		

______ $< \mu <$ ______

5.(1 pt) A random sample of n measurements was selected from a population with unknown mean μ and standard deviation σ. Calculate a 90 % confidence interval for μ for each of the following situations:
(a) $n = 70,\ \bar{x} = 59.1,\ s = 3.45$
______ $\leq \mu \leq$ ______
(b) $n = 115,\ \bar{x} = 58.7,\ s = 2.03$
______ $\leq \mu \leq$ ______
(c) $n = 80,\ \bar{x} = 76.7,\ s = 4.43$
______ $\leq \mu \leq$ ______
(d) $n = 85,\ \bar{x} = 29.8,\ s = 4.14$
______ $\leq \mu \leq$ ______

6.(1 pt) Studies have suggusted that twins, in their early years, tend to have lower IQs and pick up language more slowly than nontwins. The slower intellectual growth might be caused by benign parental neglect. Suppose it is desired to estimate the mean attention time given to twins per week by their parents. A sample of 40 sets of 2 year old boys is taken, and after 1 week the attention time recieved was recorded. The data (in hours) calculated the mean at 28.6 and the standard deviation at 13.4. Use this information to contruct a 90% confidence interval for the mean attention time given to al twin boys by their parents.
______ $< \mu <$ ______

7.(1 pt)
Use the given data to find the 95% confidence interval estiate of the population mean μ. Assume that the population has a normal distribution.
IQ scores of professional athletes:
Sample size $n = 15$
Mean $\bar{x} = 103$
Standard deviation $s = 14$
______ $< \mu <$ ______

8.(1 pt) Suppose you have selected a random sample of $n = 10$ measurements from a normal distribution. Compare the standard normal z values with the corresponding t values if you were forming the following confidence intervals.
(a) 99% confidence interval
$z =$ ______
$t =$ ______
(b) 98% confidence interval
$z =$ ______
$t =$ ______
(c) 80% confidence interval
$z =$ ______
$t =$ ______

9.(1 pt)
Weights of 10 red and 36 brown randomly chosen M&M plain candies are listed below.

Red:	0.877	0.871	0.891	0.92	0.936	
	0.923	0.933	0.874	0.924	0.909	
Brown:	0.931	0.9	0.92	0.866	0.931	0.92
	0.914	0.913	0.867	0.875	0.915	0.986
	0.898	0.921	0.988	0.897	0.904	0.923
	0.93	0.955	0.889	0.936	0.877	0.912
	0.858	1.001	0.902	0.876	0.918	0.872
	0.909	0.861	0.856	0.928	0.93	0.86

1. To construct a 90% confidence interval for the mean weight of red M&M plain candies, you have to use

- A. The normal distribution
- B. The t distribution with 11 degrees of freedom
- C. The t distribution with 10 degrees of freedom
- D. The t distribution with 9 degrees of freedom
- E. None of the above

2. A 90% confidence interval for the mean weight of red M&M plain candies is

______ $< \mu <$ ______

3. To construct a 90% confidence interval for the mean weight of brown M&M plain candies, you have to use

- A. The t distribution with 36 degrees of freedom
- B. The normal distribution
- C. The t distribution with 35 degrees of freedom
- D. The t distribution with 37 degrees of freedom
- E. None of the above

4. A 90% confidence interval for the mean weight of brown M&M plain candies is

______ $< \mu <$ ______

10.(1 pt) The following random sample was selected from a normal distribution:

9 9 9 12 17 8 1 2 15 20

(a) Construct a 90% confidence interval for the population mean μ.

______ $\leq \mu \leq$ ______

(b) Construct a 95% confidence interval for the population mean μ.

______ $\leq \mu \leq$ ______

11.(1 pt) The scientific productivity of major world cities was the subject of a recent study. The study determined the number of scientific papers published between 1994 and 1997 by researchers from each of the 20 world cities, and is shown below.

City	Number of papers	City	Number of papers
City 1	2	City 11	7
City 2	24	City 12	11
City 3	6	City 13	16
City 4	22	City 14	15
City 5	2	City 15	2
City 6	16	City 16	15
City 7	16	City 17	20
City 8	9	City 18	8
City 9	22	City 19	27
City 10	7	City 20	28

Construct a 80 % confidence interval for the average number of papers published in major world cities.

______ $< \mu <$ ______

12.(1 pt) The standard IQ test is designed so that the mean is 100 and the standard deviation is 15 for the population of all adults. We wish to find the sample size necessary to estimate the mean IQ score of statistics students. Suppose we want to be 97% confident that our sample mean is within 2 IQ points of the true mean. The mean for this population is clearly greater than 100 . The standard deviation for this population is probably less than 15 because it is a group with less variation than a group randomly selected from the general population; therefore, if we use $\sigma = 15$, we are being conservative by using a value that will make the sample size at least as large as necessary. Assume then that $\sigma = 15$ and determine the required sample size.

Answer: ______

13.(1 pt) Periodically, the county Water Department tests the drinking water of homeowners for contminants such as lead and copper. The lead and copper levels in water specimens collected in 1998 for a sample of 10 residents of a subdevelopement of the county are shown below.

lead (μg/L)	copper (mg/L)
0.9	0.837
1.8	0.17
2.2	0.48
0.2	0.393
2.7	0.611
4.4	0.812
5.3	0.414
0.1	0.752
1.7	0.564
1.9	0.544

(a) Construct a 99% confidence interval for the mean lead level in water specimans of the subdevelopment.

______ $\leq \mu \leq$ ______

(b) Construct a 99% confidence interval for the mean copper level in water specimans of the subdevelopment.

______ $\leq \mu \leq$ ______

14.(1 pt) Suppose that the minimum and maximum ages for typical textbooks currently used in college courses are 0 and 8 years. Use the range rule of thumb to estimate the standard deviation.

Standard deviation = ______

Find the size of the sample required to estimage the mean age of textbooks currently used in college courses. Assume that you want 93% confidence that the sample mean is within 0.4 year of the population mean.

Required sample size = ______

15.(1 pt) A poll is taken in which 339 out of 525 randomly selected voters indicated their preference for a certain candidate. Find a 98% confidence interval for p.

______ $\leq p \leq$ ______

16.(1 pt) Use the given confidence interval limits to find the point estimate $\hat{p}$ and the margin of error E.

$0.25 < p < 0.35$

$\hat{p} =$ ______ $E =$ ______

17.(1 pt) Astronaunts often report that there are times when they become disoriented as they move around in zero-gravity. Therefore, they ususally rely on bright colors and other visual information to help them estabish a top-down orientation. A study was conducted to assses the potential of using color as body orienting. 85 college students, reclining on their backs in the dark, found it difficult to establish orientation when positioned on under a rotating disk. This rotating disk was painted half black and half white. Out of the 85 students, 57 believed they were right side up when the white was on top.

Use this information to estimate the true proportion of subjects who use the white color as a cue for right-side-up orientation. That is, construct a 80% confidence interval for the true proportion.

__________ $\leq p \leq$ __________

18.(1 pt) Construct the 95% confidence interval estimate of the population proportion p if the sample size is $n = 100$ and the number of successes in the sample is $x = 52$.

__________ $< p <$ __________

19.(1 pt) The EPA wants to test a randomly selected sample of n water specimens and estimate the mean daily rate of pollution produced by a mining operation. If the EPA wants a 95% confidence interval with a bound of error of 1 milligram per liter (mg/L), how many water specimens are required in the sample? Assume prior knowledge indicates that pollution readings in water samples taken during a day have been approximately normally distributed with a standard deviation of 5.3 (mg/L).

$n =$ __________

20.(1 pt) College officials want to estimate the percentage of students who carry a gun, knife, or other such weapon. How many randomly selected students must be surveyed in order to be 90% confident that the sample percentage has a margin of error of 1.5 percentage points?

(a) Assume that there is no available information that could be used as an estimate of $\hat{p}$.

Answer: __________

(b) Assume that another study indicated that 6% of college students carry weapons.

Answer: __________

21.(1 pt) A random sample of elementary school children in New York state is to be selected to estimate the proportion p who have received a medical examination during the past year. An interval estimate of the proportion p with a bound of 0.055 and 99% confidence is required.

(a) Assuming no prior information about p is available, approximately how large of a sample size is needed?

$n =$ __________

(b) If a planning study indicates that p is around 0.3, approximately how large of a sample size is needed?

$n =$ __________

22.(1 pt) Find the critical values $\chi^2_L = \chi^2_{1-\alpha/2}$ and $\chi^2_R = \chi^2_{\alpha/2}$ that correspond to 98% degree of confidence and the sample size $n = 27$.

$\chi^2_L =$ __________ $\chi^2_R =$ __________

23.(1 pt) According to the Food and Drug Administration (FDA), a cup of coffee contains on average 115 miligrams (mg) of caffeine, with the amount per cup ranging from 60 to 180 mg. Suppose you want to repeat the FDA experiment to obtain an estimate of the mean caffeine content in a cup of coffee correct to witin 5.8 mg with 98% confidence. How many cups of coffee would have to be included in your sample?

$n =$ __________

24.(1 pt) Find the minimum sample size needed to be 95% confident that the sample variance is within 10% of the population variance.

____