

XIII. Place each number next to the appropriate item.

- A. Standard error of the mean 2
- B. 99% confidence interval 1
- C. Standard error of the proportion 5
- D. Requires n be ≥ 30 3
- E. Acceptable error 4

1.	$\bar{x} \pm 2.58 \frac{\sigma}{\sqrt{n}}$
2.	$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$
3.	$\bar{x} \pm 2.58 \frac{s}{\sqrt{n}}$
4.	E
5.	$\sqrt{\frac{\bar{p}(1-\bar{p})}{n}}$

XIV. Answer the following true or false and fill in the blank questions.

- A. The standard error of the mean will be halved if the sample size is doubled. F
- B. Sampling error exists because a nonrepresentative sample was taken in place of a census. T
- C. A one-number estimate of the population mean is called a point estimate of the mean.
- D. A range for a population parameter is called the confidence interval.
- E. A stratified random sample may be more accurate than a simple random sample because a small diverse section of the population might not be represented in a simple random sample.

XV. A sample of 36 out of 25,000 baseball fans attending a game revealed average refreshment spending of \$7.60. The standard deviation for the population is \$2.10. Calculate the 95% confidence interval for average refreshment spending by fans attending this game.

Given:
n = 36
N = 25,000
$\bar{x} = \$7.60$
$\sigma = \$2.10$

$$\frac{n}{N} = \frac{36}{25,000} = .001 < .05$$

The finite correction factor is not required.

$$\bar{x} \pm z \frac{\sigma}{\sqrt{n}}$$

$$\$7.60 \pm 1.96 \frac{\$2.10}{\sqrt{36}}$$

$$\$7.60 \pm \$0.686$$

$$\$6.91 \leftrightarrow \$8.29$$

Data set for those using statistics software			
Refreshment Spending			
4.50	8.00	9.00	9.00
6.95	4.90	7.00	8.05
10.00	8.00	9.50	2.00
11.00	9.00	5.00	8.00
8.05	8.50	10.00	4.80
6.00	4.90	11.00	9.00
6.50	7.00	7.00	8.00
11.00	8.00	5.00	5.75
9.10	6.00	9.10	9.00

XVI. A marketing test of chocolate flavored shaving cream revealed a favorable response from 35 of 50 test subjects. Test subjects were chosen at random from the company's 1,200 employees. Calculate the following:

- A. The 90% confidence interval for this market test.

$$\frac{n}{N} = \frac{50}{1,200} = .042 < .05$$

$$\bar{p} = \frac{35}{50} = .70$$

$$.7 \pm 1.645 \sqrt{\frac{.7(1-.7)}{50}}$$

$$n = 50 \geq 30$$

$$np = 50(.70) = 35 \geq 5$$

$$nq = 50(.30) = 15 \geq 5$$

$$\bar{p} \pm z \sqrt{\frac{\bar{p}(1-\bar{p})}{n}}$$

$$.7 \pm .107$$

$$.593 \leftrightarrow .807$$

Data set for those using statistics software				
Favorable (F) and Unfavorable (U) Attitudes Toward Chocolate Flavored Shaving Cream				
U	F	F	F	F
F	U	F	F	U
U	F	U	F	F
U	F	F	F	U
F	U	F	F	F
U	F	F	U	F
F	F	F	F	F
U	F	F	U	U
F	F	F	F	F
F	F	F	U	U

- B. The company is unhappy with the confidence interval calculated above and would like to lower acceptable error from 11% to 5%. How large a sample must be taken?

$$n = \bar{p}(1-\bar{p}) \left(\frac{z}{E} \right)^2$$

$$n = .7(1-.7) \left(\frac{1.64}{.05} \right)^2$$

$$= .21(1,075.84)$$

$$= 225.9264 \rightarrow 226$$