

Ex 1 A U.S. company manufactures about 1,000,000 fasteners (nuts, bolts, screws, etc.) per day. With such large quantities, inevitably some of the fasteners produced are defective. A quality control test is performed on a SRS of 800 fasteners; 28 of the fasteners are defective.

- Construct a 95% confidence interval for the true proportion of fasteners which are defective. Explain what is meant by this confidence interval.
- Executives decide that if the population proportion of defective fasteners is 0.05 or higher, then they will invest in new machinery to maintain product integrity. Based on this confidence interval, what do the executives conclude?
- Construct a 99% confidence interval for the true proportion of defective fasteners. Is it larger or smaller than the 95% confidence interval? Based on this confidence interval, what do the executives conclude?
- Could they have just sampled 80 fasteners? Why did they not sample 80,000 fasteners? Would it be beneficial to sample 8,000 fasteners?

Ex 2 An exit poll showed that 52% of 3000 respondents voted for Dr. CashMoney for president. Does a 95% confidence interval show that Dr. CashMoney will win the overall election?

Ex 3 (0.4965, 0.5435) is a 99% confidence interval for the population proportion of voters supporting Dr. CashMoney.

- a. Can Dr. CashMoney be declared the winner using this confidence interval?
- b. Use the interval to determine the sample proportion and the margin of error.

Ex 4 Determine whether each item is true or false. Explain.

- a. For a fixed confidence level, when the sample size increases, the length of the confidence interval for a population mean decreases.
- b. The critical value corresponding to a 90 percent confidence level is 1.96.
- c. The best point estimate for the population proportion is the sample mean.
- d. The larger the level of confidence, the shorter the confidence interval.
- e. A 90% confidence interval for a population parameter means that if a large number of confidence intervals were constructed from repeated samples, then on average, 90% of these intervals would contain the true parameter.
- f. The point estimate, \hat{p} is always at the center of the confidence interval for a population proportion.