

**A.P. Statistics**  
**Assignment 7.2**

**Remember to show your thinking through your work.**

- 1) As sample size goes up, the width of the confidence interval gets:

- 2) As sample size goes down, the width of the confidence interval gets:

- 3) As confidence level goes up, the width of the confidence interval gets:

- 4) As confidence level goes down, the width of the confidence interval gets:

- 5) A newspaper ad for a manager trainee position contained the statement "Our manager trainees have a first-year earnings average of \$20,000 to \$24,000." Do you think that the ad is describing a confidence interval? Explain your answer.

- 6) Crop researchers plant 15 plots with a new variety of corn. The yields in bushels per acre are

138.0 139.1 113.0 132.5 140.7 109.7 118.9 134.8  
109.6 127.3 115.6 130.4 130.2 111.7 105.5

Assume that  $\sigma = 10$  bushels per acre.

- (a) Find the 90% confidence interval for the mean yield for this variety of corn.

- (b) Find the 95% confidence interval.

- (c) Find the 99% confidence interval.

- (d) How do the margins of error in (a), (b), and (c) change as the confidence level increases?

- 7) A test for the level of potassium in the blood is not perfectly precise. Moreover, the actual level of potassium in a person's blood varies slightly from day to day. Suppose that repeated measurements for the same person on different days vary normally with  $\sigma = 0.2$ .

- (a) Julie's potassium level is measured once. The result is  $x = 3.4$ . Give a 90% confidence interval for her mean potassium level.

- (b) If three measurements were taken on different days and the mean result is  $x = 3.4$ , what is a 90% confidence interval for Julie's mean blood potassium level?

- (c) How large a sample of Julie's potassium levels in the previous exercise would be needed to estimate her mean within 0.06 with 95% confidence?

- 8) Researchers planning a study of the reading ability of third-grade children want to obtain a 95% confidence interval for the population mean score on a reading test, with margin of error no greater than 3 points. They carry out a small pilot study to estimate the variability of test scores. The sample standard deviation is  $s = 12$  points in the pilot study, so in preliminary calculations the researchers take the population standard deviation to be  $\sigma = 12$ .

- (a) The study budget will allow as many as 100 students. Calculate the margin of error of the 95% confidence interval for the population mean based on  $n = 100$ .

- (b) There are many other demands on the research budget. If all of these demands were met, there would be funds to measure only 10 children. What is the margin of error of the confidence interval based on  $n = 10$  measurements?

- (c) Find the smallest value of  $n$  that would satisfy the goal of a 95% confidence interval with margin of error 3 or less. Is this sample size within the limits of the budget?

