

23. Age Discrimination? The accompanying stemplots depict ages of applicants who were unsuccessful in winning promotion and ages of applicants who were successful in winning promotion (based on data from “Debating the Use of Statistical Evidence in Allegations of Age Discrimination” by Barry and Boland, *American Statistician*, Vol. 58, No. 2). Assume that the samples are simple random samples and use a 95% confidence level to construct the two confidence interval estimates of the two population means. Compare the results. What do you conclude?

Ages of Unsuccessful Applicants

3	4778
4	12344555689
5	3344567
6	0

Ages of Successful Applicants

3	367889
4	2233444555566778899
5	1124

24. Interbreeding of Cultures Changes in head sizes over time suggest interbreeding with people from other regions. Use the data depicted in the accompanying dotplots and construct 95% confidence intervals to determine whether skull breadths (mm) appear to have changed from 4000 B.C. to 150 A.D. Explain your conclusion.



Sample Size. In Exercises 25–32, find the sample size required to estimate the population mean.

25. Mean IQ of Professional Pilots The Wechsler IQ test is designed so that the mean is 100 and the standard deviation is 15 for the population of normal adults. Find the sample size necessary to estimate the mean IQ score of professional pilots. We want to be 90% confident that our sample mean is within 3 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. Does the sample size appear to be reasonable?

26. Mean Grade Point Average As part of a study of grade inflation, you want to estimate the mean grade point average of all current college students in the United States. All grade point averages are to be standardized for a scale between 0 and 4. How many grade point averages must be obtained so that the sample mean is within 0.2 of the population mean? Assume that a 99% confidence level is desired. Also assume that a pilot study showed that the population standard deviation is estimated to be 0.79. Does it make sense to collect the entire sample at your college?

27. Buying a Corvette Research of selling prices for used two-year-old Corvettes reveals that they have a standard deviation of \$2157 (based on data from Edmunds.com). How many selling prices must you obtain in order to estimate the mean selling price of these cars? Assume that you want 98% confidence that your sample mean is within \$250 of the population mean. Is it likely that you will find that many two-year-old used Corvettes in your region?