

1. Many drugs used to treat cancer are expensive. BusinessWeek reported on the cost per treatment of Herceptin, a drug used to treat breast cancer (BusinessWeek, January 30, 2006). Typical treatment costs (in dollars) for Herceptin are provided by a simple random sample of 10 patients.

4356 5587 2734 4923 4488
4792 6454 4116 4220 3808

- a. Develop a point estimate of the mean cost per treatment with Herceptin (to 1 decimal).
- b. Develop a point estimate of the standard deviation of the cost per treatment with Herceptin (to 1 decimal).
2. Business Week conducted a survey of graduates from 30 top MBA programs (Business Week, September 22, 2003). The survey found that the average annual salary for male and female graduates 10 years after graduation was \$168,000 and \$117,000, respectively. Assume the population standard deviation for the male graduates is \$45000, and for the female graduates it is \$25000.
- a. What is the probability that a simple random sample of 40 male graduates will provide a sample mean within \$10,000 of the population mean, \$168,000 (to 4 decimals)?
- b. What is the probability that a simple random sample of 40 female graduates will provide a sample mean within \$10,000 of the population mean, \$117,000 (to 4 decimals)?
- c. In which of the preceding two cases, part (a) or part (b), do we have a higher probability of obtaining a sample estimate within \$10,000 of the population mean?
- d. What is the probability that a simple random sample of 100 male graduates will provide a sample mean more than \$4,000 below the population mean (to 4 decimals)?

3. The president of Doerman Distributors, Inc., believes that 34% of the firm's orders come from first-time customers. A simple random sample of 120 orders will be used to estimate the proportion of first-time customers.
 - a. Assume that the president is correct and $p = 0.34$. What is the sampling distribution of \bar{p} for this study?
 - b. What is the probability that the sample proportion will be between .20 and .40 (to 4 decimals)?
 - c. What is the probability that the sample proportion will be between .25 and .35 (to 4 decimals)?

4. Americans have become increasingly concerned about the rising cost of Medicare. In 1990, the average annual Medicare spending per enrollee was \$3267; in 2003, the average annual Medicare spending per enrollee was \$6883 (Money, Fall 2003). Suppose you hired a consulting firm to take a sample of fifty 2003 Medicare enrollees to further investigate the nature of expenditures. Assume the population standard deviation for 2003 was \$1800.
 - a. Calculate the standard error of the mean amount of Medicare spending for a sample of fifty 2003 enrollees (to 2 decimals).
 - b. What is the probability the sample mean will be within +/- \$300 of the population mean (to 4 decimals)?
 - c. What is the probability the sample mean will be greater than \$7500 (to 4 decimals)?

If the consulting firm tells you the sample mean for the Medicare enrollees it interviewed was \$7500, would you question whether the firm followed correct simple random sampling procedures?

5. The mean television viewing time for Americans is 15 hours per week (Money, November 2003). Suppose a sample of 60 Americans is taken to further investigate viewing habits. Assume the population standard deviation for weekly viewing time is $\sigma = 4$ hours.
- What is the probability the sample mean will be within 1 hour of the population mean (to 4 decimals)?
 - What is the probability the sample mean will be within 45 minutes of the population mean (to 4 decimals)?
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7. A market research firm conducts telephone surveys with a 38% historical response rate. What is the probability that in a new sample of 400 telephone numbers, at least 150 individuals will cooperate and respond to the questions? In other words, what is the probability that the sample proportion will be at least $150/400 = .375$? Calculate the probability to 4 decimals.