Extending Concepts

Confidence Intervals **In Exercises 19–22, use the confidence interval to find the sample mean and the margin of error.**

19. An electronics magazine reports that a 90% confidence interval for the mean price of GPS navigation systems is \$178.75 to \$211.87.

20. A state agency reports that a 95% confidence interval for the mean annual salaries of employees in Colorado is \$45,832 to \$47,890.

21. A hospital reports that a 99% confidence interval for the mean length of stay (in days) of patients is 5.1 to 5.9.

22. A company reports that a 95% confidence interval for the mean weight (in ounces) of filled paint cans is 159.97 to 160.03.

Minimum Sample Size **For a 95% confidence level, the minimum sample size n needed to estimate the population mean is**

$$n = \left(\frac{1.96s}{E}\right)^2$$

where E is the margin of error and s is the population standard deviation. In Exercises 23–26, find the minimum sample size. If necessary, round your answer up to a whole number.

23. You want to estimate the mean weight of newborns within 0.25 pound of the population mean. Assume the population standard deviation is 1.3 pounds.

24. You want to estimate the mean number of text messages sent per day by 18- to 24-year-olds within 5 messages of the population mean. Assume the population standard deviation is 30 messages.

25. You want to estimate the mean number of hours of television watched per person per day within 0.1 hour of the population mean. Assume the population standard deviation is 1.5 hours.

26. You want to estimate the mean number of minutes waiting at a department of motor vehicles office within 0.5 minute of the population mean. Assume the population standard deviation is 7 minutes.