

## The Central Limit Theorem

- The distribution of the number of people in line at a grocery store has a mean of 3 and a variance of 9. A sample of the numbers of people in line in 50 stores is taken.
  - Calculate the probability that the sample mean is more than 4.
  - Calculate the probability the sample mean is less than 2.5.
  - Calculate the probability that the sample mean differs from the population mean by less than 0.5.
- A book publisher claims that its mean book length is 250 pages with a standard deviation of 70 pages. What is the probability that for a sample of 45 randomly selected books, the mean length of a book is less than 230 pages?
- Suppose the length of a baseball game is 175.9 min with a standard deviation of 27.0 min. For a random sample of 30 games, what is the probability the mean game length is at most 170 minutes?
- A pencil manufacturer claims that its pencils have lengths that are normally distributed with a mean of 6.0 in and a variance of 0.2. What is the probability that a randomly chosen pencil will have a length more than 6.4 in?
- At a large university, the mean amount spent by students for cell phone service is \$38.90 per month with a standard deviation of \$3.64 per month. Consider a group of 44 randomly chosen university students. What is the probability that the mean amount of their monthly cell phone bills differs from the mean for the university by more than \$1?
- The local nursery is waiting for its spring annuals to be delivered, and 20% of the plants ordered are petunias. If the first truck contains 120 plants packed at random, what is the probability that no more than 30 plants are petunias?
- A news report stated that 65% of vehicles sold nationally were SUVs. A random sample of 100 vehicles sold in the last month is taken. What is the probability that at least 70 of the vehicles in the sample were SUVs?
- At one private college, 34% of students are business majors. Suppose that 260 students are randomly selected from a list in the registrar's office. What is the probability that the proportion of business students in the sample differs from the population proportion by less than 2%?
- A major appliance retailer claims that 18% of its sales are dishwashers. If 112 appliances are sold are randomly selected, what is the probability that the proportion of dishwashers sold differs from the population proportion by over 2%?