

1. A USA Today Poll asked a random sample of 1012 U.S. adults what they do with the milk in the bowl after they have eaten the cereal. Let  $\hat{p}$  be the proportion of people in the sample who drink the cereal milk. A spokesman for the dairy industry claims that 70% of all U.S. adults drink the cereal milk. Suppose this claim is true.
  - a. What is the mean of the sampling distribution of  $\hat{p}$ ? Why?
  
  
  
  
  
  
  
  
  
  
  - b. Find the standard deviation of the sampling distribution of  $\hat{p}$ . Check to see if the 10% condition is met.
  
  
  
  
  
  
  
  
  
  
  - c. Is the sampling distribution of  $\hat{p}$  approximately Normal? Check to see if the Large Counts condition is met.
  
  
  
  
  
  
  
  
  
  
  - d. Of the poll respondents, 67% said that they drink the cereal milk. Find the probability of obtaining a sample of 1012 adults in which 67% or fewer say they drink the cereal milk if the milk industry spokesman's claim is true. Does this poll give convincing evidence against the claim? Explain.
  
  
  
  
  
  
  
  
  
  
2. A sample survey interviews an SRS of 267 college women. Suppose that 70% of college women have been on a diet within the past 12 months. What is the probability that 75% or more of the women in the sample have been on a diet?
  
  
  
  
  
  
  
  
  
  
3. A mail-order company advertises that it ships 90% of its orders within three working days. You select an SRS of 100 of the 5000 orders received in the past week for an audit. The audit reveals that 86 of these orders were shipped on time.
  - a. If the company really ships 90% of its orders on time, what is the probability that the proportion in an SRS of 100 orders is 0.86 or less? Show your work.

- b. A critic says, "Aha! You claim 90%, but in your sample the on-time percentage is lower than that. So the 90% claim is wrong." Explain in simple language why your probability calculation in part (a) shows that the result of the sample does not refute the 90% claim.
4. About 75% of young adult Internet users (ages 18-29) watch online videos. Suppose that a sample survey contacts an SRS of 1000 young adult Internet users and calculates the proportion  $\hat{p}$  in this sample who watch online videos.
- What is the mean of the sampling distribution of  $\hat{p}$ ? Explain
  - Find the standard deviation of the sampling distribution of  $\hat{p}$ . Check that the 10% condition is met.
  - Is the sampling distribution of  $\hat{p}$  approximately normal? Check that the Large Counts condition is met.
  - If the sample size were 9000 rather than 1000, how would this change the sampling distribution of  $\hat{p}$ ?
5. The Gallup Poll once asked a random sample of 1540 adults, "Do you happen to jog?" Supposed that the true proportion of all adults who jog is  $p = 0.15$ .
- What is the mean of the sampling distribution of  $\hat{p}$ ? Justify your answer.
  - Find the standard deviation of the sampling distribution of  $\hat{p}$ . Check that the 10% condition is met.
  - Is the sampling distribution of  $\hat{p}$  approximately Normal? Justify your answer.
  - Find the probability that between 13% and 17% of a random sample of 1540 adults are joggers.