Chapter 15

1. Website An investment website can tell what devices are used to access the site. The site managers wonder whether they should enhance the facilities for trading via smartphones so they want to estimate the proportion of users who access the site that way (even if they also use their computers sometimes). They draw a random sample of 200 investors from their customers. Suppose the true proportion of smartphone users is 36%.
a) What would you expect the shape of the sampling distribution for the sample proportion to be?
b) What would be the mean of this sampling distribution?
c) What would be the standard deviation of the sampling distribution?

5. Marriage According to a Pew Research survey, 27% of American adults are pessimistic about the future of marriage and the family. That is based on a random sample of about 1500 people. Is it reasonable for Pew Research to use a Normal model for the sampling distribution of the sample proportion? Why or why not?

6. Campus sample For their final project, a student plans on surveying a random sample of 50 students on whether they plan to go to Florida for Spring Break. From past years, they guess that about 10% of the class goes. Is it reasonable for them to use a Normal model for the sampling distribution of the sample proportion? Why or why not?

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13. Tips A waiter believes the distribution of their tips has a model that is slightly skewed to the right, with a mean of $9.60 and a standard deviation of $5.40.
a) Explain why you cannot determine the probability that a given party will tip him at least $20.
b) Can you estimate the probability that the next 4 parties will tip an average of at least $15? Explain.
c) Is it likely that his 10 parties today will tip an average of at least $15? Explain.

15. More tips The waiter in Exercise 13 usually waits on about 40 parties over a weekend of work.
a) Estimate the probability that they will earn at least $500 in tips.
b) How much does they earn on the best 10% of such weekends?

9. Pregnancy Assume that the duration of human pregnancies can be described by a Normal model with mean 266 days and standard deviation 16 days.
a) What percentage of pregnancies should last between 270 and 280 days?
b) At least how many days should the longest 25% of all pregnancies last?
c) Suppose a certain obstetrician is currently providing prenatal care to 60 pregnant women. Let $\bar{y}$ represent the mean length of their pregnancies. According to the Central Limit Theorem, what's the distribution of this sample mean, $\bar{y}$? Specify the model, mean, and standard deviation.
d) What's the probability that the mean duration of these patients' pregnancies will be less than 260 days?