Voters. ***In Exercises 9–12, use a normal approximation to find the probability of the indicated number of voters. In each case, assume that 100 eligible voters aged 18–24 are randomly selected. The most recent Census Bureau results show that among eligible voters aged 18–24, 22% of them voted.***

9. Probability that fewer than 20 voted

10. Probability that at least 25 voted

11. Probability of exactly 23 voters

12. Probability of exactly 19 voters

13. Tennis Replay In the year that this exercise was written, there were 611 challenges made to referee calls in professional tennis singles play. Among those challenges, 172 were upheld with the call overturned. Assume that 30% of the challenges are successfully upheld with the call overturned.

a. Find the probability that among the 611 challenges, the number of overturned calls is exactly 172.

b. Of the 611 challenges, the number of 172 overturned calls is fewer than 30%. Find the probability that among the 611 challenges, the number of overturned calls is 172 or fewer. If the 30% rate is correct, is 172 overturned calls for 611 challenges an unusually low number?

c. Which result is useful for determining whether the 30% rate is correct: part (a) or part (b)? Explain.

d. Is there strong evidence to suggest that the rate of overturned calls is not 30%?

14. Tennis Replay Repeat the preceding exercise after changing the assumed rate of overturned calls from 30% to 33%.

15. Mendelian Genetics When Mendel conducted his famous genetics experiments with peas, one sample of offspring consisted of 580 peas, with 428 of them having green pods. If we assume, as Mendel did, that under these circumstances, there is a 3/4 probability that a pea will have a green pod, we would expect that 435 of the peas would have green pods, so the result of 428 peas with green pods is fewer than expected. For the following, assume that the probability of a pea having a green pod is 3/4.

a. Find the probability that among the 580 offspring peas, exactly 428 of them have green pods.

b. The result of 428 peas with green pods is fewer than 3/4 of 580. Find the probability that among the 580 offspring peas, 428 or fewer have green pods. Is the result of 428 peas with green pods unusually low?

c. Which result is useful for determining whether Mendel's claimed rate of 75% is incorrect: part (a) or part (b)? Explain.

d. Is there strong evidence to suggest that Mendel's probability of 3/4 is wrong?

16. Dream Job In a Marist College poll of 1004 adults, 291 chose professional athlete as their dream job. Assume that 25% of adults consider being a professional athlete their dream job.

a. The result of 291 is more than 25% of 1004, so find the probability that among 1004 random adults, 291 or more consider being a professional athlete their dream job.

b. If the value of 25% is correct, is the result of 291 unusually high?

c. Does the result suggest that the rate is greater than 25%?

17. XSORT Gender Selection MicroSort's XSORT gender-selection technique is designed to increase the likelihood that a baby will be a girl. In updated results (as of this writing) of the XSORT gender-selection technique, 945 births consisted of 879 baby girls and 66 baby boys