13. Cell Phones and Brain Cancer In a study of 420,095 cell phone users in Denmark, it was found that 135 developed cancer of the brain or nervous system. If we assume that the use of cell phones has no effect on developing such cancer, then the probability of a person having such a cancer is 0.000340.

a. Assuming that cell phones have no effect on developing cancer, find the mean and standard deviation for the numbers of people in groups of 420,095 that can be expected to have cancer of the brain or nervous system.

b. Based on the results from part (a), is 135 cases of cancer of the brain or nervous system unusually low or high?

c. What do these results suggest about the publicized concern that cell phones are a health danger because they increase the risk of cancer of the brain or nervous system?

14. Test of Touch Therapy Nine-year-old Emily Rosa conducted this test: A professional touch therapist put both hands through a cardboard partition and Emily would use a coin flip to randomly select one of the hands. Emily would place her hand just above the hand of the therapist, who was then asked to identify the hand that Emily had selected. Touch therapists believed that they could sense the energy field and identify the hand that Emily had selected. The trial was repeated 280 times. (Based on data from "A Close Look at Therapeutic Touch," by Rosa et al., *Journal of the American Medical Association,* Vol. 279, No. 13.)

a. Assuming that the touch therapists have no special powers and made random guesses, find the mean and standard deviation for the numbers of correct responses in groups of 280 trials.

b. The professional touch therapists identified the correct hand 123 times in the 280 trials. Is that result unusually low or high? What does the result suggest about the ability of touch therapists to select the correct hand by sensing an energy field?

15. Deciphering Messages The Central Intelligence Agency has specialists who analyze the frequencies of letters of the alphabet in an attempt to decipher intercepted messages that are sent as ciphered text. In standard English text, the letter *r* is used at a rate of 6%.

a. Find the mean and standard deviation for the number of times the letter *r* will be found on a typical page of 2600 characters.

b. In an intercepted ciphered message sent to Iran, a page of 2600 characters is found to have the letter *r* occurring 178 times. Is this unusually low or high?

16. Deciphering Messages The Central Intelligence Agency has specialists who analyze the frequencies of letters of the alphabet in an attempt to decipher intercepted messages that are sent as ciphered text. In standard English text, the letter *e* is used at a rate of 12.7%.

a. Find the mean and standard deviation for the number of times the letter *e* will be found on a typical page of 2600 characters.

b. In an intercepted ciphered message sent to France, a page of 2600 characters is found to have the letter *e* occurring 290 times. Is 290 unusually low or unusually high?

17. Too Young to Tat Based on a Harris poll of 370 adults who regret getting tattoos, 20% say that they were too young when they got their tattoos.

a. For randomly selected groups of 370 adults who regret getting tattoos, find the mean and standard deviation for the number who say that they were too young when they got their tattoos.

b. For a randomly selected group of 370 adults who regret getting tattoos, would 90 be an unusually low or high number who say that they were too young when they got their tattoos?