Statistics

Extra Problems -- Z scores

1) A factory makes machine screws for the space industry. The dimensions of these screws need to be very precise. Of the millions of screws produced daily the mean length is 10 cm. The standard deviation for the production of these screws is .01 cm. A screw is considered defective if it is shorter than 9.98 cm or longer than 10.02 cm. Assuming that the screw production represents a normal distribution what is the probability that:

   a) one screw, selected at random, will be defective?
   b) a screw, selected at random, will not be defective?
   c) two out of two screws will be too small?

2) A lawyer commutes daily from her home to her downtown office. On average the trip one way takes 24 minutes, with a standard deviation of 3.8 minutes. Assume the distribution to be normal.

   a) What percentage of the time will the trip take at least half an hour?
   b) If her work day begins at 8:30 and she leaves the house at 8:10, what percentage of the time will she be late for work?

3) For a particular population with a population mean of 28.5 and a known standard deviation of 5.5, what is the probability that a sample of 100 will have a mean:

   a) equal to or less than 30.0
   b) equal to or less than 28.0
   c) equal to or more than 29.5
   d) between 28.0 and 29.0

4) In a particular city the average number of parking tickets a person will receive per year is 10. The standard deviation across the city is 3.5 tickets.

   a) What percentage of the city's 100,000 drivers do you expect to receive 4 tickets or less per year. (Assume that the receipt of parking tickets is normally distributed.)

   b) A group of 16 University students is selected. As a group, their mean number of parking tickets is 11. What is the probability that a sample of drivers, drawn randomly from the whole population, would have a mean number of tickets equal to or greater than 11?