

Tutorial 8

1. If X is a normal random variable with parameters $\mu = 3$ and $\sigma^2 = 9$, find (a) $P\{2 < X < 5\}$; (b) $P\{X > 0\}$; (c) $P\{|X - 3| > 6\}$.
 2. A randomly chosen IQ test taker obtains a score that is approximately a normal random variable with mean 100 and standard deviation 15. What is the probability that the score of such a person is (a) above 125; (b) between 90 and 110?
 3. Suppose that the travel time from your home to your office is normally distributed with mean 40 minutes and standard deviation 7 minutes. If you want to be 95 percent certain that you will not be late for an office appointment at 1 P.M., what is the latest time that you should leave home?
 4. The life of a certain type of automobile tire is normally distributed with mean 34,000 miles and standard deviation 4000 miles.
 - (a) What is the probability that such a tire lasts over 40,000 miles?
 - (b) What is the probability that it lasts between 30,000 and 35,000 miles?
 - (c) Given that it has survived 30,000 miles, what is the conditional probability that the tire survives another 10,000 miles?
 5. The annual rainfall in Cleveland, Ohio is approximately a normal random variable with mean 40.2 inches and standard deviation 8.4 inches. What is the probability that
 - (a) next year's rainfall will exceed 44 inches?
 - (b) the yearly rainfalls in exactly 3 of the next 7 years will exceed 44 inches?
- Assume that if A_i is the event that the rainfall exceeds 44 inches in year i (from now), then the events A_i , $i \geq 1$, are independent.
6. To determine the effectiveness of a certain diet in reducing the amount of cholesterol in the bloodstream, 100 people are put on the diet. After they have been on the diet for a sufficient length of time, their cholesterol count will be taken. The nutritionist running this experiment has decided to endorse the diet if at least 65 percent of the people have a lower cholesterol count after going on the diet. What is the probability that the nutritionist endorses the new diet if, in fact, it has no effect on the cholesterol level?