

Tutorial 5

- 4.79 A manufacturer of digital phones has the following probability distribution for the number of defects per phone:

x	$f(x)$
0	.89
1	.07
2	.03
3	.01

- (a) Determine the probability of 2 or more defects.
 - (b) Is a randomly selected phone more likely to have 0 defects or 1 or more defects?
- 4.80 Upon reviewing recent use of conference rooms at an engineering consulting firm, an industrial engineer determined the following probability distribution for the number of requests for a conference room per half-day:

x	$f(x)$
0	.07
1	.15
2	.45
3	.25
4	.08

- (a) Currently, the building has two conference rooms. What is the probability that the number of requests will exceed the number of rooms for a given half-day?

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- (b) What is the probability that the two conference rooms will not be fully utilized on a given half-day?
 - (c) How many additional conference rooms are required so that the probability of denying a request is not more than 0.10?
- 4.81 Refer to Exercise 4.80 and obtain the
(a) mean; (b) variance; (c) standard deviation for the number of requests for conference rooms.
- 4.84 A basketball player makes 90% of her free throws. What is the probability she will miss for the first time on the seventh shot?
- 4.86 If the probability is 0.85 that a fully charged digital camera battery will take 150 or more pictures, find the probabilities that among 18 such batteries
- (a) 16 will take 150 pictures or more;
 - (b) at least 14 will take 150 pictures or more;
 - (c) at most two will not take 150 pictures or more.
- 4.88 As can be easily verified by means of the formula for the binomial distribution, the probabilities of getting 0, 1, 2, or 3 heads in 3 flips of a coin whose probability of heads is 0.4 are 0.216, 0.432, 0.288, and 0.064. Find the mean of this probability distribution using
- (a) the formula that defines μ ;
 - (b) the special formula for the mean of a binomial distribution.

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- 4.89 With reference to Exercise 4.88, find the variance of the probability distribution using
- (a) the formula that defines σ^2 ;
 - (b) the special formula for the variance of a binomial distribution.
- 4.90 Find the mean and the standard deviation of the distribution of each of the following random variables (having binomial distributions):
- (a) The number of heads in 440 flips of a balanced coin.
 - (b) The number of 6's in 300 rolls of a balanced die.
 - (c) The number of defectives in a sample of 700 parts made by a machine, when the probability is 0.03 that any one of the parts is defective.
- 4.91 Use the Poisson distribution to approximate the binomial probability $b(1; 100, 0.02)$.
- 4.94 Records show that the probability is 0.00004 that a car will have a flat tire while driving through a certain tunnel. Use the formula for the Poisson distribution to approximate the probability that at least 2 of 10,000 cars passing through the tunnel will have a flat tire.
- 4.95 The number of weekly breakdowns of a computer is a random variable having a Poisson distribution with $\lambda = 0.2$. What is the probability that the computer will operate without a breakdown for 3 consecutive weeks?