Practice Problems for Chapter 4

OpenIntro P.124 #3.31,3.35; P.129 #3.43; P.156 #4.17,4.19,4.22; P165. #4.31,4.33; P.166 #4.35,4.48

Historical Course Pack P. 119 #3.13,3.15; P.122 #3.33,3.35; P.125 #3.37, 3.45; P.132 #3.55,3.57,3.63; P.149 #3.97,3.99,3.101,3.103

1. Given the following probability distribution for the discrete random variable X, what is

X	1	3	8	9
$P(X = x)$	0.25	0.2	0.25	0.3

   (a) $P(X > 3)$ (b) $P(X \geq 3)$ (c) μ_X (d) σ_X^2

2. What two things must a probability distribution for a random variable display?

   (a) all possible values of the random variable and their associated probability

   (b) all possible experimental outcomes and their associated probability

   (c) all values of the random variable and all experimental outcomes

   (d) all values of the random variable and the probability of each experimental outcome

3. A game show contestant on *Let's Make a Deal* selects two envelopes with prize money enclosed. Two of the envelopes contain \$100, one envelope contains \$250, two envelopes contain \$500, and the last envelope contains \$1000. Define the random variable M be the maximum prize of the two envelopes selected. Construct the probability distribution and find the expected value of M.

4. Bad weather is to blame for some of the worst highway crashes in Canada. Highway 63 in Alberta has a notorious reputation; on average there are 4 accidents per week on this road. Suppose a week is randomly selected.

   (a) Define the random variable and state its distribution.

   (b) What is the probability that there are exactly 6 crashes on this road?

   (c) What is the probability that there are at least 3 crashes on this road?

   (d) What is the mean and variance of the number of crashes on the road in the week?

5. Mars corporation (the manufacturer of Skittles, candy) states that 20% of all Skittles, candy produced are lime-flavored. Suppose we randomly draw 25 Skittles, from a bag.

   (a) Define the random variable and state its distribution.

   (b) What is the probability exactly 5 are lime-flavoured?

   (c) What is the probability at least 10 are lime-flavoured?

   (d) What is the mean and variance of the number of lime-flavoured candies?