

Show all work. Your answers must be fully justified. You do not need to simplify your answers.

1. A gumball machine has 10 red gumballs, 20 blue gumballs, and 25 yellow gumballs. If two gumballs are dispensed randomly (without replacement) from the machine, what is the probability that:

(a) the first one dispensed is red and the second one dispensed is yellow?

(b) both of the gumballs dispensed are yellow?

(c) neither of the gumballs dispensed is yellow?

2. For the following probability distribution (showing all possible outcomes):

x	$P(x)$
40	0.1
50	0.3
60	
70	

(a) Complete the table so that the distribution makes sense and so that an outcome of 70 is twice as likely as an outcome of 60.

(b) Find the expected value of the distribution.

3. Suppose that based on earlier studies, it has been determined that 80% of finches are carriers of a particular gene. If an ornithologist randomly chooses 15 finches to observe, what is the probability that:

(a) exactly 5 of them have the gene?

(b) fewer than 3 of them have the gene?