

find that the answer is 0.981. They interpret this to mean that 98.1% of the time, the number of tickets they find will be between 1 and 7 inclusive. This gives them a good idea of what to expect in their data.

Comparing what *should* happen with what *does* happen is a critical idea in statistics. In the next few chapters we will develop a formal method for doing this called *hypothesis testing*.



Discovery Exercise 6.1

EXPLORING THE BINOMIAL DISTRIBUTION

n = 150 Students
probability = .70
not = .30

Dear Mom and Dad: Send cash

According to USA Today, 70% of college students receive spending money from their parents when at school.

For this exercise you need to simulate selecting 30 samples of 5 students from this population of college students and observe whether they receive spending money from their parents. Consider the successful outcome to be “receives money” with $p = 0.70$ and the failure outcome to be “does not receive money.” If your instructor does not provide you with a method, you can take ten (small) pieces of paper and write an S on seven of them and an F on three of them. Put the papers in a bag or other container and select one at random to simulate an observation. *Note:* Be sure to replace the paper each time or p will not always be 0.70.

- Record an S when you select a student who receives money from his/her parents and an F when you select a student who does not receive spending money from his/her parents. For each sample, record the number of successes you sampled.

In the last column compute a running estimate of p . Remember that p is the probability of a successful outcome. In this case, p is known to be 0.70. Let's see how close the estimate gets to 0.70 as the sample size increases. So, after the first sample is selected, your estimate of p is simply the number of successes divided by 5. After the second sample is selected, your estimate of p is the number of successes in both samples divided by 10, and so forth.

Sample number	Observation number					X = Total number of successes in $n = 5$ trials	Running total number of successes	Running total of number sampled	Estimate of p
	1	2	3	4	5				
1								5	
2								10	
3								15	
4								20	
5								25	
6								30	
7								35	
8								40	
9								45	

S/5
S/10