**Activity 7.3.3a Informal Conditional Probability**

1. Suppose a jar contains 3 white, 2 blue, and 5 red marbles. If you draw marbles from the container *without replacing them*, then probabilities change as more and more marbles are drawn from the container.

a. Let *A* be the event of getting a red marble on the first draw. Find *P*(*A*).

b. Let *B* be the event of getting a red marble on the second draw after draw.. Find the probability that *B* occurs given that we know that *A* has occurred. Using probability notation, we can express this probability as . Explain how you got your answer.

c. Let *C* be the event of getting a white marble on the third draw. Find the probability that *C* occurs given you know events *A* and *B* have occurred. Using probability notation, we can express this probability as . Explain how you got your answer.

In question 1 you calculated conditional probabilities, probabilities that one event will occur given that another event has already occurred. For the remainder of this activity, you will compare conditional and unconditional probabilities of events from everyday situations.

The notation for **conditional probability**, , is read as “the probability of *B* given *A*.”

2. Consider the probability pairs below. For each pair, state whether you think the conditional probability is higher, lower, or the same as the unconditional probability. Write a sentence justifying your answer. (Not every case has a single correct answer. Therefore, your justification is as important as your answer.)

a. *P*(person has blue eyes)

 *P*(person has blue eyes | person is a Red Sox Baseball fan)

b. *P*(student watches Thursday Night Football)

 *P*(student watches Thursday Night Football | student is female)

c. *P*(person drinks a cup of coffee most mornings)

 *P*(person drinks a cup of coffee most mornings | person is under 12 years old)

d. *P*(it is going to rain)

 *P*(it is going to rain | the sky is cloudy)

e. *P*(roll a die and get an even number)

 *P*(roll a die and get an even number | roll a number greater than 3)

f. *P*(draw a card from a standard deck of cards and get a face card)

 *P*(draw a card from a standard deck of cards and get a face card | card drawn is a heart)

g. Based on your answers to (a – f) decide whether the two events involved in the conditional distributions are independent or dependent.

3. Order the following probabilities from smallest to largest. Explain your choice of probability order.

*P*(man is tall)

*P*(man is tall | man is a professional basketball player)

*P*(man is professional basketball player | man is tall)