Example 1: Suppose that two dice are rolled. Take x = number shown by first dice, and y = number shown by the second dice.

a) What is the probability of $A = \{x + y = 5\}$
b) What is the probability of $B = \{|x - y| = 3\}$
c) Assume we know that $x + y = 5$; what is the probability of B?

Example 2:

a) Roll two dice. What is the probability that the sum of the dice is 8?

b) Given that the first die is 3 what is **now** the probability to have the sum equal to 8?

Example 3 - Conditional Probabilities: Suppose that the chances to have a daughter or to have a son are equal. The Jones' have two kids.

a) I ring their doorbell and the younger kid who happens to be a girl opens the door. What is the chance that the older kid is also a girl?

b) I ring their doorbell and their daughter opens the door. What is the probability that the other kid is a girl?

Example 3'

Assume that in a family all sex distributions are equally likely.

a) From the set of all families with two children a family is selected at random and is found that one of the kids is a girl. What is the probability that the other child of the family is also a girl?

b) From the set of all families with two children, a child is selected at random and is found to be a girl. What is the probability that the second child is also a girl ?

Example 4 - sample space reduction An urn contains 10 white, 5 yellow and 10 black marbles. A marble is chosen at random from the urn and it is noticed that it is not a black one. What is the probability that it is a yellow one?

Example 5 - Sample Space Reduction: A chef mixes (by mistake!) 10 good and five bad eggs. A soccer team is being served the 15 eggs. If the first four players are still well, what is the probability that the fifth one is sick?

Example 6 - Sample Space Reduction: A deck of cards is dealt equally to four players. Assuming that two players receive 8 spades among them what is the probability that among the other two players the distribution of the spades is (3,2)?

Example 7 - Multiplication Rule X is undecided as to whether take a French course or a Statistics course. Although she actually prefers Statistics, X estimates that her probability of getting an A in French would be 1/2 whereas it would be only 1/3 in Statistics. If X decides to make up her mind based on the flip of a fair coin what is her chance to get an A in Statistics. What is her chance to get an A?