Homework 2

Problem of the week. Suppose a box contains 3 white balls and 3 black balls. The white balls are labeled with 1, 2 and 3 respectively, and the same is true for the black balls. Suppose that a ball is drawn randomly and it is noted that it is white. What is the probability that it is labeled with a 1?

Solution Let A be the event that a white ball is drawn and let B be the event that a ball labeled 1 is drawn. Our problem is to find $P(B|A)$. From the counting principle, i.e. there are 3 white balls, 3 black balls and 2 balls numbered 1 out of 6 total, $P(A) = 1/2$, $P(B) = 1/3$ and $P(A \cap B) = 1/6$, we find

$$P(B|A) = \frac{P(A \cap B)}{P(A)} = \frac{1/6}{1/2} = \frac{1}{3}.$$

Also solve practice problems 1, 10 and 11 in Chapter 2 of MB.