probability rules

exercise 5

In an experiment on human memory, participants have to memorize a set of words (B_1), numbers (B_2), and pictures (B_3). These occur in the experiment with the probabilities $P(B_1) = 0.5,\ P(B_2) = 0.4,\ P(B_3) = 0.1$.

Then participants have to recall the items (where A is the recall event). The results show that $P(A \mid B_1) = 0.4,\ P(A \mid B_2) = 0.2,\ P(A \mid B_3) = 0.1$.

(a) Compute $P(A)$, the probability of recalling an item.

(b) What is the probability that an item that is correctly recalled (A) is a picture (B_3)?

counting outcomes

A permutation of items is an arrangement of the items in a certain order, where each item can be used only once in the sequence: $n! = n(n-1)(n-2)\cdots(2)(1)$

A permutation of n items taken k at of time is the number of ways to select k items from n distinct items and arranging them in order:

$$P(n,k) = \frac{n!}{(n-k)!}$$

A combination of n items taken k at of time any selection of k items from n elements where order is not important:

$$\binom{n}{k} = \frac{n!}{k!(n-k)!}$$