# Tutorial 5 Suggested Problems 

Probability

Oct. 21

## Chapter 3 Example 5b page 91

A female chimp has given birth. It is not certain, however, which of two male chimps is the father. Before any genetic analysis has been performed, it is felt that the probability that male number 1 is the father is $p$ and the probability that male number 2 is the father is $1-p$. DNA obtained from the mother, male number 1 , and male number 2 indicate that, on one specific location of the genome, the mother has the gene pair $(A, A)$, male number 1 has the gene pair $(a, a)$, and male number 2 has the gene pair $(A, a)$. If a DNA test shows that the baby chimp has the gene pair $(A, a)$, what is the probability that male number 1 is the father?

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Independent trials, each resulting in a success with probability $p$ or a failure with probability $q=1-p$, are performed. We are interested in computing the probability that a run of $n$ consecutive successes occurs before a run of $m$ consecutive failures.

## Chapter 4 Example 1b page 113

A life insurance agent has 2 elderly clients, each of whom has a life insurance policy that pays $\$ 100,000$ upon death. Let $Y$ be the event that the younger one dies in the following year, and let $O$ be the event that the older one dies in the following year. Assume that $Y$ and $O$ are independent, with respective probabilities $P(Y)=.05$ and $P(O)=.10$. If $X$ denotes the total amount of money (in units of $\$ 100,000$ ) that will be paid out this year to any of these clients' beneficiaries, what are the possible values of $X$ and their associated probabilities.

