1 Problem 1

A factory produces its entire output with two machines. Machine I and II produce 30% and 70% of the output, respectively. There are 25% and 15% of the outputs of machine I and II are defective, respectively.

(a) What percent of the output is defective?
(b) What percent of the defective output are from machine I?

2 Problem 2

A box contains 80 green apples and 20 red apples. We cannot see inside the box. Two apples are chosen at random without replacement.

(a) What is the probability that the first apple chosen is green?
(b) What is the probability that both apples are green?
(c) What is the probability that at least one apple is green?
(d) What is the probability that the second apple chosen is red?
(e) What is the probability that the second apple chosen is green given that the first one is red?

3 Problem 3

The relay network shown in the figure operates if and only if there is a closed path of relays from left to right. Assume that relays fail independently and the probability of failure of each relay is shown in the figure. What is the probability that the relay network works?

Figure 1: Relay network.
4 Problem 4

In a swimming class, only 70% of the students who take the class pass the final test.

(a) Calculate the probability of not passing the class after 5 independent trials of the test.

(b) You are told that a group of three people has taken the test and at least one of them passes. Calculate the probability (given that information) that all three people passed.