1. Consider betting repeatedly \$3 on a flip of a fair coin.

   (a) What is the probability that breaking even *for the forth time* will happen during the first 100 rounds?

   (b) What is the expected number of times one will break even during the first 100 rounds, and the corresponding standard deviation.

2. Without Maple, find the expected number of rolls (and the corresponding standard deviation) to generate the pattern

   (a) of 4 consecutive non-sixes,

   (b) E6E6E (6 means six, E means anything else).

   (c) Using Maple, compute the probability that the last pattern will take more than 90 rolls to generate.

3. Consider flipping a coin to generate the pattern HHTTHH.

   (a) Without Maple, compute the expected number of flips (and the corresponding standard deviation) to generate this pattern for the *third* time (the occurrences are *not* allowed to overlap).

   (b) Using Maple, find the expected number (and the corresponding standard deviation) of occurrences of this pattern in 400 flips of a coin,

   (c) and the probaility of generating between 5 and 8 such occurrances (inclusive) in 400 flips.

4. Without Maple, calculate

   (a) the probability of getting 2 consecutive sixes before 8 consecutive non-sixes,

   (b) the expected duration and the corresponding standard deviation of such a game.

   (c) Using Maple, find the probability that completing *two* such games (one after the other) will take fewer than 30 rolls.

5. If the pattern HTTH is played against THT, find

   (a) its probability of winning,

   (b) the expected duration of the game (in terms of number of flips) and the corresponding standard deviation,

   (c) the expected number of such games one would complete in 50 flips (when these are played one ofter another), and the corresponding standard deviation.