INTRODUCTORY MATHEMATICAL STATISTICS
(STAT2001/6039)

Tutorial 11

Problem 1

Whenever you place an amount of money on black in the game of roulette
at the casino, you double that money with probability 18/37
and lose it with probability 19/37.

You have decided to place $10 on black 50 times in a row.

Use the central limit theorem to approximate the probability that you will:

      (a)   not lose any money overall

      (b)   neither gain nor lose any money overall (ie, come out exactly even).

Problem 2

15 resistors were randomly selected from the output of a process supposedly
producing 10-ohm resistors. The 15 resistors showed a sample mean of 9.8 ohms and
a sample standard deviation of 0.5 ohms.

Find a 95% confidence interval for the true mean resistance of resistors produced by
this process. Assume that resistance measurements are normally distributed.

Problem 3

In conducting an inventory and audit of parts in a certain stockroom, it was found that, for 60 items sampled, the audit value exceeded the book value on 45 items.

Find a 90% confidence interval for the true fraction of items in the stockroom for which the audit value exceeds the book value.

Problem 4

Suppose that 2.6, 1.2 and 4.9 are a random sample from a normal distribution whose mean is zero and whose variance v is unknown.

Derive and compute a central 99% confidence interval for v.