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Probability and Statistics

Examples 6

In questions 1 and 2, carry out the analyses (i) using a hand calculator together with a book of statistical tables, and (ii) using `R`. Where appropriate, check that, apart from any differences due to rounding, the two methods yield the same results.

1. An investigator has been told that half of the individuals in some population are smokers. He carries out a survey in which a random sample of size 400 is taken from the population. It is found that 230 of the sample members are smokers and 170 are non-smokers.

(i) Carry out a test to determine to what extent the result of the survey provides evidence against the claim that half the population are smokers. Draw conclusions.

(ii) Give an estimate of and find a 95% confidence interval for the proportion of the population who are smokers.

2. In a pandemic of a virulent new strain of influenza, a randomly selected 150 of influenza patients admitted to a hospital in a given week were given treatment A and the remaining 300 were given treatment B. Of the 150 patients given treatment A, 15 died, and of the 300 patients given treatment B, 45 died.

Carry out a test to determine to what extent these data provide evidence that there is a difference between the two treatments in preventing death.