InkMaths

QUESTION WORKBOOK

Comparing two normal means

Further Statistics 2 · Year FM

6 questions · 22 marks

PRINT EDITION

inkphysics.co.uk/maths

SECTION A · Warm-up

A1 Two independent samples of size 25 come from populations with variances 50 and 30. Find the standard error of the difference of the sample means. [2]

A2 Sample 1: n = 36, mean 21.4, population variance 9. Sample 2: n = 49, mean 19.6, population variance 16. Find the standard error of the difference and the test statistic for equal means. [3]

SECTION B · Standard

B1 Sample 1: n = 36, mean 21.4, population variance 9. Sample 2: n = 49, mean 19.6, population variance 16, giving a standard error of 0.759 and a test statistic of 2.37. Test at the 5% level whether the population means differ. [4]

B2 Two samples give means 21.4 and 19.6, with a standard error of 0.759 for their difference. Find a 95% confidence interval for the difference of the population means, and check it agrees with a two-tailed test at the 5% level. [4]

B3 Explain what changes if the population variances are unknown but both samples are large. [3]

SECTION C · Stretch

C1 Sample 1: n = 36, mean 21.4, population variance 9. Sample 2: n = 49, mean 19.6, population variance 16, giving a standard error of 0.7593 and a test statistic of 2.371. Test at the 1% level, one-tailed, with critical value 2.3263. Then find the smallest difference of sample means that would have been significant at that level, and comment on the pair of results. [6]