4. A college runs academic and vocational courses. The college has 1680 academic students and 2520 vocational students.

(a) Describe how a stratified sample of 70 students at the college could be taken.

(3)

All students at the college take a basic skills test. A random sample of 50 academic students has a mean score of 57 and a variance of 60. An independent random sample of 80 vocational students has a mean score of 62 with a variance of 70

(b) Stating your hypotheses clearly, test at the 5% level of significance, whether or not the mean basic skills score for vocational students is greater than the mean basic skills score for academic students.

(7)

(c) Explain the importance of the Central Limit Theorem to the test in part (b).

(2)

(d) State an assumption that is required to carry out the test in part (b).

(1)

All the academic students at the college take a basic skills course. Another random sample of 50 academic students and another independent random sample of 80 vocational students retake the basic skills test. The hypotheses used in part (b) are then tested again at the same level of significance.

The value of the test statistic z is now 1.54

(e) Comment on the mean basic skills scores of academic and vocational students after taking this course.

(2)

(f) Considering the outcomes of the tests in part (b) and part (e), comment on the effectiveness of the basic skills course.

(1)

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