

A company has two machines, A and B , which independently fill small bottles with a liquid. The volumes of liquid per bottle, in suitable units, filled by machines A and B are denoted by x and y respectively. A scientist at the company takes a random sample of 40 bottles filled by machine A and a random sample of 50 bottles filled by machine B . The results are summarised as follows.

$$\Sigma x = 1120 \quad \Sigma x^2 = 31400 \quad \Sigma y = 1370 \quad \Sigma y^2 = 37600$$

The population means of the volumes of liquid in the bottles filled by machines A and B are denoted by μ_A and μ_B .

- (a)** Test at the 2% significance level whether there is any difference between μ_A and μ_B . [8]
- (b)** Find the set of values of α for which there would be evidence at the $\alpha\%$ significance level that $\mu_A - \mu_B$ is greater than 0.25. [4]