

Seva is investigating the lengths of the tails of adult wallabies in two regions of Australia,  $X$  and  $Y$ . He chooses a random sample of 50 adult wallabies from region  $X$  and records the lengths,  $x$  cm, of their tails. He also chooses a random sample of 40 adult wallabies from region  $Y$  and records the lengths,  $y$  cm, of their tails. His results are summarised as follows.

$$\Sigma x = 1080 \quad \Sigma x^2 = 23\,480 \quad \Sigma y = 940 \quad \Sigma y^2 = 22\,220$$

It cannot be assumed that the population variances of the two distributions are the same.

- (a)** Find a 90% confidence interval for the difference between the population mean lengths of the tails of adult wallabies in regions  $X$  and  $Y$ . [6]

The population mean lengths of the tails of adult wallabies in regions  $X$  and  $Y$  are  $\mu_X$  cm and  $\mu_Y$  cm respectively.

- (b)** Test, at the 10% significance level, the null hypothesis  $\mu_Y - \mu_X = 1.1$  against the alternative hypothesis  $\mu_Y - \mu_X > 1.1$ . State your conclusion in the context of the question. [4]