3. A zoologist collected the weights of a random sample of 90 Western grey kangaroos and a random sample of 90 Eastern grey kangaroos.

The results are summarised below, where x denotes the weights, in kg, of the Western grey kangaroos and y denotes the weights, in kg, of the Eastern grey kangaroos.

$$\bar{x} = 40 \qquad s_x^2 = 18.49 \qquad \sum y = 3780 \qquad \sum y^2 = 164599.29$$

(a) Find unbiased estimates for the mean **and** variance of the weights of the Eastern grey kangaroos.

(3)

The zoologist claims that the mean weight of the Western grey kangaroo is less than the mean weight of the Eastern grey kangaroo.

(b) Stating your hypotheses clearly, carry out a suitable test to assess the zoologist's claim.
Use a 5% level of significance and state your critical value.

(7)

(c) State an assumption you have made in carrying out the test in part (b)

(1)

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Question 3 continued

(Total for Question 3 is 11 marks)