2. An ornithologist believes that there is a relationship between the tail length, t mm, and the wing length, w mm, of female hook-billed kites. A random sample of size 10 is taken from a database of these kites and the relevant data is given in the table below.

t (mm)	191	197	208	180	188	210	196	191	179	208
w (mm)	284	285	288	273	280	283	288	271	257	289

The ornithologist plans to use a linear regression model based on these data and interpolate or extrapolate as necessary to estimate the wing length of other female hook-billed kites from their tail length.

(a) (i) Explain what is meant by extrapolation.

(1)

(ii) Explain the dangers of extrapolation.

(1)

The ornithologist attempts to calculate the product moment correlation coefficient, r, and obtains a value of 1.3

(b) Explain how she should be able to identify that this is incorrect without carrying out any further calculations.

(1)

(c) Use your calculator to find the correct value of the product moment correlation coefficient, r.

(1)

(d) Stating your hypotheses clearly test, at the 1% significance level, whether or not there is evidence that the product moment correlation coefficient for the population is positive.

(3)

(e) Explain what your test in part (d) suggests about female hook-billed kites.

(1)